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THE UNIVERSITY OF ALBERTA

# EFFECTIVENESS OF A PHYSICAL ACTIVITY ADHERENCE COUNSELING PROGRAM WITH OLDER FEMALES

BY

JOCHEN GERD BOCKSNICK

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND
RESEARCH IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF PHYSICAL EDUCATION AND SPORT STUDIES

EDMONTON, ALBERTA
SPRING 1991

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ISBN 0-315-66791-5

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DEGREE: Doctor of Philosophy

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FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled "Effectiveness of Physical Activity Adherence Counseling Program with Older Females" submitted by Jochen Gerd Bocksnick in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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## ABSTRACT

The purpose of this study was to evaluate the effectiveness of short-term counseling for facilitating regular physical activity involvement in non-institutionalized female seniors. Subjects (N = 32) were assigned to either counseling group (N = 14, mean age = 64.07, SD = 5.66) or control group (N = 18, mean age = 67.27, SD = 4.81) according to their place of residence. Both groups received the same written information and submitted physical activity diaries on a weekly basis; only the experimental group experienced short-term counseling. The evaluation involved a quantitative comparison of the physical activity involvement of subjects receiving counseling with that of control subjects and a qualitative analysis of the adherence process demonstrated by subjects receiving counseling. Independent t-test analysis revealed no significant difference between physical activity involvement of experimental and control subjects prior to the study ($t(df,30) = 0.35$; $p = 0.72$; $M_1 = 225.35$, $M_2 = 254.72$). A 2 x 4 repeated measures analysis of variance was utilized to investigate differences in involvement of the two groups across four time periods: pre-study, pre-intervention, intervention, post-intervention. A statistically significant time effect was calculated ($F = 3.29$, $df = 3$, $p = 0.02$), while the treatment and interaction effects were both non-significant. Both groups showed an increase in physical activity involvement following the introductory lecture and with the beginning of self-monitoring and it was maintained for subsequent measures. Both groups reported significant improvements in perceived health and physical fitness when comparing pre-study and post-study. Experimental subjects evaluated the counseling positively regardless of actual increments in their physical activity behavior. The qualitative analysis revealed that both changing health and social support were important influences on the physical activity involvement. The study did not provide sufficient evidence for a time-related treatment effect which may be attributed to an existing difference in perceived health between both groups. Submission of diaries to a contact person and dissemination of information may be sufficient for improving the physical activity behavior of older adults. The triangulation of quantitative and qualitative methods was helpful in evaluating the effectiveness of short-term counseling as a means for increasing the physical activity behavior of older females.

## ACKNOWLEDGEMENTS

This study was a tremendous challenge for me — and now after finishing it, I know I could not have completed this task without the help I received. I would like to express my deepest appreciation to all those who were involved directly or indirectly in this project.

I am very thankful for the opportunity to study under the guidance of my "counseling" supervisor, Dr. Leonard Wankel. He gave me a chance to experience how beneficial building up of motivating power is and how powerful when challenged at the right time.

I would like to thank the members of the examining committee, Drs. Eugene Fox, Brian Nielsen, Murray Smith, and Jane Watkinson, and the external examiner, Dr. Barry McPherson, for challenging this study and encouraging me to continue in this field.

Furthermore, my appreciation is extended to the subjects who volunteered for this project, and the Canadian Fitness and Lifestyle Research Institute which provided the financial assistance for this research.

Finally, I would like to express my greatest thankfulness to Joi. Without her, this study would not have been — even if I had known the answers to questions myself.

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# CHAPTER 1 INTRODUCTION

It is projected that within the next three decades the population of older adults in Alberta will increase by more than fifty percent, from 201,000 to 472,000. Because the elderly are the main users of health care this projection suggests an increasing potential burden on the health care system. This potential burden might be reduced, however, if awareness among older adults of preventive health care measures is increased and appropriate health care actions are subsequently taken (Bausell, 1986; Palmore, 1986).

Regular physical exercise is one of the most advocated strategies for preventive health care (Bausell, 1986) because of its positive associations with physical and mental health benefits (Paffenbarger & Hyde, 1988; Sime, 1984; Smith, 1984). Information about the importance of regular exercise for individuals of all ages has been disseminated in various forms and for various reasons. The mass media regularly depicts the importance of a physically active lifestyle through advertisments, feature articles, and documentaries. Despite this, a general adoption of more physically active lifestyles is not yet evident. Perkins and Epstein (1988) observe that before any systematic assessment of exercise-related health benefits can be made, researchers must be able to optimize the clients' adherence to exercise behavior. "Research that is designed to investigate the health benefits of regular aerobic exercise may be hampered by problems with participant compliance" (p. 399). Non-compliant subject behavior has prevented researchers from determining the potential benefits of regular exercise behavior. Only the compliant participant provides him/herself with the chance of experiencing long-term benefits from regular exercise.

With respect to older adults, national surveys of physical activity involvement have reported disappointingly low participation levels (Canada Fitness Survey, 1983; Meusel, 1980; NACA. 1989). The recent Campbell Survey of Well-Being (Stephens & Craig, 1990) reported that 50% of males and 30% of females over the age of 65 are regularly (i.e., every other day) active at a moderate level of intensity (i.e., 50% or greater of age-specific capacity).

"Despite the deleterious overall effects of aging on the body's ability to adapt and respond to physical activity, its capacity to improve performance through regular training is retained well into advanced age" (Birrer, 1989, p.78). Evidence clearly indicates that older adults approach advanced stages of immobility more quickly when physical challenges are insufficient. Although aging cannot be stopped (Kavanagh & Shephard, 1990) and maximum life expectancy cannot be extended (Jokl, 1983) premature mortality may be decreased as a result of regular exercise involvement (Paffenbarger, 1989). Physically active individuals, in comparison to other older adults, encounter fewer physical ailments

and report greater self-esteem and a better quality of life (McPherson, 1986; MacNeil & Teague, 1987). A realistic goal for physical activity programs for older adults is therefore to minimize the inevitable age-related reduction of physical capabilities (e.g., strength, flexibility, etc.).

"The most serious medical problems that plague the majority of Americans and Europeans today are not primarily medical problems at all; they are behavior problems, requiring the alteration of personal habits, preferences, or decisions. Thus they fall squarely within the domain of health counseling" (Janis, 1983, p. 5). In other words, lack of appropriate decisions regarding general preventive health care actions or poor adherence to decisions that are made may be primary reasons for many health problems.

Merely believing in the positive benefits of regular exercise rarely results in subsequent changes in behavior (Knapp,1988); such changes require an environment in which individuals are encouraged to develop strategies and plans for reaching self-determined goals (King, Taylor, Haskell & DeBusk, 1988; Wankel, 1988a). This can be accomplished through short-term counseling (Janis,1983) which includes such procedures as demonstrating empathy, encouraging an appropriate level of self-disclosure, and providing continuous positive but selective feedback.

The effectiveness of counseling is evaluated by whether or not there has been a change of behavior (Janis, 1982) but it is also helpful to know the effectiveness of the various facets of the counseling procedure. On the basis of his review, Janis suggested the following structured approach to counseling health behaviors:

1. Ensuring the client perceives the counselor as being a genuine helper. To be effective the counselor has to obtain motivating power, which must be established during the initial phase of a counseling intervention (Janis, 1982, 1983).

2. Assisting versus authoritatively controlling the client in the decision-making process. According to Janis (1983), such a condition is achieved best if the counselor demonstrates empathy and establishes referent power.

3. Providing the client with positive but selective feedback. The relevance of this condition has been empirically supported (Janis, 1983). To ensure constructive criticism is perceived as positive feedback, counselor and client must analyze the client's progress together.

4. Ensuring the client is aware that the behavior change is a result of his/her own doing (Janis, 1983). This demands a more frequent contact between client and counselor in which the opportunity is created to reflect on the client's intention and action to undergo behavior changes. Demonstrating self-responsibility for behavior modification is particularly critical during the termination phase of the counseling.

Despite a limited number of meetings between clients and counselors, short-term counseling has been shown to be as effective as more time-consuming counseling procedures (Janis, 1983); in fact, more than two or three sessions does not seem to improve adherence to the target behavior. These conclusions, however, were based on such preventive health behaviors as smoking cessation or weight reduction and such findings may be behavior-specific. Wankel (1988b) suggested more sessions might be required to better deal with the extensive information involved in an exercise adherence counseling program. This recommendation was based on the results of a short-term exercise adherence counseling program for employees in a work-place activity context.

## 1.1 Statement of the Problem

The purpose of this study was to evaluate the effectiveness of a short-term counseling treatment for facilitating regular physical activity involvement in non-institutionalized female seniors. The evaluation was done: (a) by comparing the amount of physical activity involvement of subjects receiving counseling to that of control subjects not receiving counseling, and (b) by investigating the changes in individual physical activity patterns over time as related to the counseling intervention.

## 1.2 Experimental hypotheses

### Hypotheses: physical activity involvement

Following the pre-intervention period, the physical activity involvement (i.e., time of involvement, frequency of exercise bouts, and number of different activities) of subjects receiving counseling will increase more than that of control subjects, and it will remain greater for subjects receiving counseling from this time onward (Figure 1.1).

The physical activity involvement of all subjects will decrease (i.e., time of involvement, frequency of exercise bouts, and number of different activities) in the post-intervention period as compared to the intervention period, although subjects receiving counseling will show a smaller decrease. Both groups, however, are expected to maintain a higher level of physical activity involvement than they exhibited in the pre-study assessment.

### Hypothesis: perceived health and physical fitness

The self-ratings for perceived health and physical fitness of the two groups will not differ statistically prior to the study, but the subjects receiving counseling will show a greater improvement in both measures.

A statistically significant positive association will exist between the rating of perceived health and physical fitness at the end of the study and (a) the subjects' exercise behavior at the end of the study and (b) the subjects' behavior change from pre-intervention period to post-intervention period.

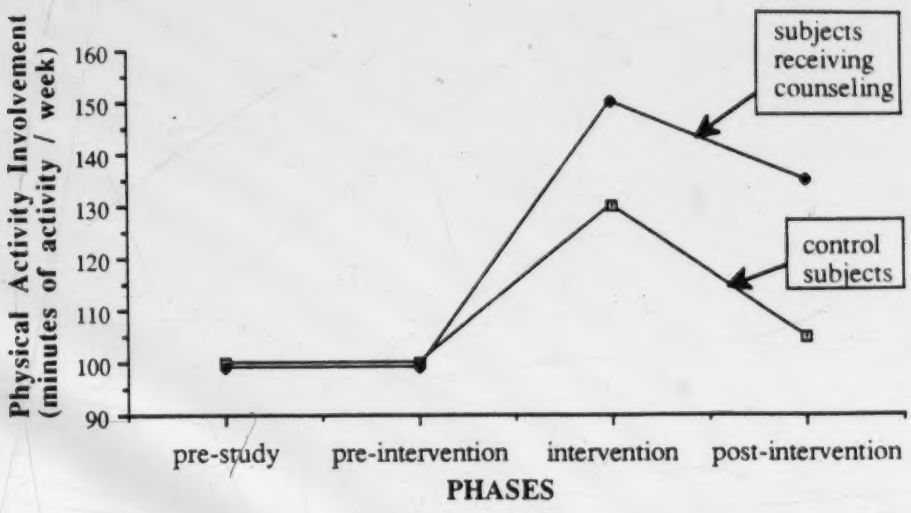


Figure 1.1 Graphical representation of experimental hypotheses for the exercise adherence process of counseling and control subjects.

Hypothesis: belief evaluation of goal attainment

Subjects receiving counseling will report a more positive perception of having reached their exercise goal than will control subjects.

A statistically significant positive association will exist between the rating of goal attainment and (a) exercise behavior at the end of the study and (b) behavior change from pre-intervention period to post-intervention period.

Hypothesis: perception of counseling situation for subjects receiving counseling

A statistically significant positive association will exist between an individual's evaluation of the short-term counseling (as assessed by levels of self-disclosure, reinforcement, advice, empathy, self-efficacy, commitment to behavior change, and referent power) and (a) exercise behavior at the end of the study and (b) behavior change from pre-intervention period to post-intervention period.

1.3 Definitions

Adherence counseling. Helping individuals in resolving their own physical activity adherence problems by assisting them in finding potential solutions to problem-related behaviors.

Physical activity. Action deliberately initiated for the purpose of improving or maintaining one's personal level of physical fitness.

Physical Activity Diary. Activity assessment tool in which subjects report on a daily basis the type of each activity, the duration for each activity, and the intensity for each activity.

Physical activity involvement. The following three components comprised the construct:

1. Weekly accumulated time of all valid entries in the physical activity diary or the seven-day recall instrument,
2. Weekly accumulated number of all valid physical activity entries,
3. Weekly accumulated number of different physical activities (e.g., walking, and stretching, etc.).

Physical activity intensity. The intensity of involvement in their physical activities that the subjects reported in their physical activity diaries. Intensity was rated according to the following descriptors:

1. Light — slight changes in breathing,
2. Medium — some perspiring and above normal breathing, and
3. Heavy — heavy perspiring and heavy breathing.

Pre-study period. The assessment period immediately after the introductory lecture and prior to the beginning of the self-monitoring.

Pre-intervention period. The assessment period following the introductory lecture and starting with the self-monitoring but without any other manipulation.

Intervention period. The assessment period during which the subjects in the treament condition received the exercise counseling.

Post-intervention period. The assessment period following the behavioral manipulation and ending with the submission of the last physical activity diary.

Post-study period. The assessment period immediately after the submission of the last physical activity diary.

Pre-study questionnaire. The questionnaire administered immediately following the introductory lecture, to assess self-perception of personal health, physical fitness, intention

to be physically active, a seven-day recall of physical activity involvement, and factual information (demographics).

Post-study questionniare. The questionnaire administered immediately following the submission of the last physical activity diary, to assess self-perception of personal health, physical fitness, program evaluation, and a seven-day recall of physical activity involvement.

Percentage change score. A percentage deviate of physical activity involvement calculated for each subject separately from pre-intervention period to (a) intervention period and (b) to post-intervention period.

Social support. The existence of active (e.g., accompanying the subject in an activity) or passive support (e.g., reminding the subject of an activity, providing transportation to the location of the activity) as assessed during the adherence counseling.

## 1.4 Need for the Study

The study has the potential for both practical and theoretical implications. On a practical level, the study should assist older adults in accomplishing the goal of increasing their physical involvement. Many older adults do not exercise enough to maintain a level of physical fitness that is sufficient to meet daily requirements (McPherson, 1986, Shephard, 1989). Physiological benefits that result from regular exercise involvement including, improved cardiovascular response efficiency, muscular strength, and flexibility have been repeatedly identified (Caspersen, Powell & Christenson, 1985; Haskell, 1987; Pérusse et al., 1987; Shephard, 1986). In addition, psychological benefits such as improvements in perceived life-satisfaction, well-being and happiness and declines in anxiety and depression are also attributed to regular activity (Kellner, 1985; Larsen, 1978; Lawton, 1983; Sloan, 1989; Stull, 1988; Taylor & Brown, 1988). Kellner cautioned, however, that psychological improvements were probably not triggered through an activity-specific mechanism but rather through a belief in being in control of the action. Despite these frequently published benefits of exercise, Brooks (1988) and Caspersen, Christenson, and Pollard (1986) estimated that only 10 to 20% of individuals 65 years of age and older were sufficiently active to maintain a level of physical fitness considered appropriate by the U. S. Surgeon General. Meusel (1980) observed that while most older people have the physical capabilities to be active, the majority are inactive.

To address this problem the U. S. Surgeon General set the objective for 1990 to be having 50% of individuals over the age of 65 in the United States involved in appropriate physical activity such as walking, swimming, and bicycling (in Caspersen et al., 1986). In

addition, Frontera and Evans (1986) and Vellas, Cayla, Bocquet, dePemille, and Albarede (1987) challenged health care practioners with the task of addressing the decision of older adults to avoid voluntary physical challenges. Interventions that are successful in manipulating exercise behavior and that can be flexibly applied to various target groups stand the greatest chance for assisting health care professionals with their challenge (Knapp, 1988). With its positive results in manipulating complex health-related behaviors such as smoking cessation or weight reduction (Janis 1982, 1983) short-term counseling is a promising option. Janis' short-term counseling procedure is designed to establish motivating power, use it to facilitate desired behavior change and subsequently maintain the change after contact is terminated. The counselor's goal is to establish him/herself as a referent person who is perceived by the client as knowledgeable, likeable, and dependable. Janis' short-term counseling procedure also provides the opportunity for tailoring the counseling to the needs of the individual by integrating various motivational aides and strategies (e.g., use of a social support system, decision-balance sheet, relapse prevention strategy, self-monitoring, etc.) (Janis, 1983; Wankel, 1988b). This flexibility may be particularly effective for the exercise adherence domain since (a) exercise behavior is very complex, (b) individual activity preferences vary considerably, (c) previous exercise exposure may affect current behavioral intention, and (d) each individual's exercise behavior is constrained by different factors. Adherence research could benefit from knowing the efficacy of utilizing short-term counseling as a method to provide multifaceted intervention strategies. Unfortunately, short-term counseling has received only limited testing in the area of exercise adherence of a more general population (Wankel, 1988b) and none in the realm of exercise enhancement for older adults.

A change of exercise behavior, however, can be problematic as it has to relate to an individual's total lifestyle rather than to the attendance of "an" exercise class (McPherson, 1986). Fortunately, exercise is adaptable — it can take place anywhere, at any time (i.e., at home, on the way to work, alone or together with spouse or friends), providing the individual knows different exercise alternatives, how to reinforce the activity behavior, how to set realistic goals, and how to prevent possible relapses. Reflecting on the variability of the responses of individuals to these questions, little value can be expected from strategies that lack the sensitivity of meeting the needs and capabilities of the individual client (Egan, 1982). To reach maximum effectiveness in modifying the lifestyle of an individual through counseling, "Support strategies ought to be generated in congruence with the subject's desires and goals" (Janis, 1983, p. 25).

On a theoretical level, the study should give insight into the value of using short-term counseling in an exercise setting, in general, and with older adults, in particular. Janis (1983) stresses the importance of the counselor developing referent power in order to be able to motivate the client to accomplish the desired behavior change. He identified several strategies (e.g., moderate level of self-disclosure, positive but selective feedback, etc.) which he believed conducive to establishing referent power. This study will help determine how selected counseling procedures, based on the development of referent power, influence behavior change pertaining to physical activity involvement.

Although older adults have been shown to respond to counseling in a way that is similar to younger individuals, counselors must be aware of special characteristics which may be found within some members of this age group (e.g., shorter attention span, increased caution regarding strangers, etc.) (Glass & Grant, 1983; Gross, 1988; Hayslip, Schneider, & Bryant, 1987; Rogers, 1989). This study may help to identify special considerations necessary for using Janis' short-term counseling guidelines to counsel older adults to be more physically active.

## 1.5 Assumptions

Subjects will record their activity involvement accurately.

Subjects will not have to refrain or withdraw from exercising for financial reasons. The exercise adherence counseling focuses on home-based and self-initiated exercises, while not excluding participation in organized fitness classes, which makes it a low-cost program for the individual.

Subjects will not have to discontinue exercising for extended periods of time because of deteriorating health conditions. For evaluation purposes, an individual's physical activity involvement record will be adjusted if there is evidence that she was unable to exercise for a week or more because of ill health or any other uncontrollable factor (e.g., death of spouse). The adjustment of an activity score during any one of the three study periods, pre-intervention, intervention, post-intervention, will be done by omitting the score in calculating the averages.

All study participants will record their involvement for the same time period to control for such extraneous variables as weather or seasonal effects.

## 1.6 Limitations

An inherent problem in a field study is the inability to control all extraneous variables. In this study, the decision to be physically more active may have been hampered by commitments outside the study or health conditions of subjects and their spouses.

Self-reports are subject to unknown biases of the respondents. Subjects were asked to be honest when completing the physical activity diaries and both pre- and post-study questionnaires.

Because some subjects are more willing to share information than others, it is unavoidable that differing amounts of information are retrieved from different subjects during the counseling sessions.

## 1.7 Delimitations

Although generalization of the results is restricted by the non-random sampling procedure, it is thought that the sample is generally representative of non-institutionalized older female adults in the Edmonton metropolitan area who would like to increase their physical activity involvement.

The recognition of a treatment effect immediately following the intervention will be impossible because each weekly diary record starts on a Monday whereas the counseling sessions are dispersed throughout the week.

# CHAPTER 2 LITERATURE REVIEW

Positive associations between regular physical activity involvement and physical and mental health are the foundation for promoting exercise as a means of preventive health care. However, the adoption and long-term maintenance of exercise behavior seems to be a difficult task. This research investigates the use of Janis' (1983) short-term counseling strategy in enhancing the adoption and maintenance of a more physically active lifestyle by older adults. Four major areas of research are considered pertinent to this investigation. The first area focuses on the physiological and psychological benefits of continued physical activity involvement for older adults. This literature not only shows that there are benefits that justify the promotion of regular physical activity in older adults, but indicates in which areas the older adult is most susceptible to disability as a result of insufficient physical activity (e.g., loss of bone density, cardiovascular fitness, or muscular strength). This information constitutes the basis for providing exercise-specific advice. The second area looks at adherence research which has identified approaches that may assist in the initiation and maintenance of preventive health care behaviors in particular. This is important because adherence to unaccustomed behavior (e.g., modified diet, medication intake, or exercise) has been shown to be difficult regardless of the benefits that are associated with the adoption of the behavior. This information could show how individuals can be assisted in their adoption of the desired behavior change of increased exercise. The third area addressed is short-term counseling, which is a particular approach that has been effective in assisting individuals in modifying their health-related behaviors. Counseling research has identified factors that increase the likelihood of success when applying such individualized intervention strategies. This constitutes the information basis for implementing the current program. The fourth area involves the methodological concerns associated with the assessment of, and the adherence to, physical activity behavior and the evaluation of counseling interventions.

## 2.1 Physical Activity Involvement of Older Adults

Exercise bouts of at least 20 minutes in duration, 3 to 5 days per week, and at an intensity of 60 to 80% of the maximum heart rate are recommended for achieving cardiovascular improvements (Morgan & Goldston, 1987), but health benefits may be obtained from activity involvement that is less intense (King et al., 1988). Exercise sessions of less than 20 minutes do not have a training effect while exercise sessions of more than 40 minutes do not add significantly to the training effect (Birrer, 1989). Three exercise bouts per week at 70% of $VO_2max$ are of greater value than five to six sessions at

40% of $VO_2$max. A recent survey reported that 50% of the 65 years and older respondents were physically active at a moderate intensity level (i.e., 50% or greater of age-specific cardiovascular capacity), at regular intervals (i.e., every other day, on average), and for sufficient duration (i.e., 30 minutes or longer) (Stephens & Craig, 1990). These figures suggest a positive development in the number of older adults in Canada who are regularly active, an increase of 22 % for males and 15 % for females when compared to population statistics from 1981 (Canada Fitness Survey, 1983). Despite the positive trend, 50% of this age cohort is still inactive. Physical inactivity should still be considered a major problem for the older population since the reason for many seniors experiencing cognitive and physical decline probably lies in self-chosen and self-defeating lifestyles (Labouvie-Vief in Thornton & Collins, 1986). Herbert and Teague (1989) reported that even though health-related activities (e.g., blood pressure control) increase with age, exercise is an exception to this rule. Older individuals experience an increasing need of regular and appropriate physical challenges, but choose to withdraw from physical activity behavior (Haskell, 1984).

### 2.1.1 Factors Influencing Exercise Involvement of Older Adults

Both practitioner and researcher are interested in knowing salient beliefs and motives which are linked to the initiation and maintenance of regular exercise behavior. Age- and gender-related motives and their relationship to physical activity involvement have been the focus of several research endeavors (Godin, Beamish, Wipper, Shephard, & Colantonio, 1988; Harvey & Singelton, 1989; Heitman, 1986; Myers & Gonda, 1986; Myers, Weigel & Holliday, 1989). The design of successful exercise enhancing strategies is fostered through knowledge of motivational factors which affect the decision-making process regarding exercise as a preventive health behavior (Godin et al., 1988).

Health, the primary reason for exercise initiation. The sedentary older person tends to initiate exercise for the practical reason of improvement or maintenance of health (Heitman, 1986). Striving for health maximizes functional independence, including the ability to live independently with an optimal level of physiological, psychological, and social well-being (WHO in Carter, McKenna & Martin, 1989). Myers (1987) observed that to avoid an inactivity-inability spiral, self-responsibility regarding preventive health care behavior must be promoted, perhaps even demanded. Myers (1987) compared the "downward spiral" to a chain reaction in which inactivity was followed by reduced capability to withstand physical challenges, which then was followed by even more rapid tiring. Feelings of clumsiness were followed by fears of falling which again were

followed by further and further withdrawal from a physically challenging environment. DeBendette (1988) argued that individuals can positively influence their personal state of health by acting self-responsibly. Current information indicates that most older adults rationalize their involvement in exercise for reasons of physical health (DeBendette, 1988). Current information also indicates that the overall health of older adults has improved (Palmore, 1986).

Based on census data, Brooks (1988) and Stephens (1988) reported a direct association between increasing age and decreased physical activity involvement. With age as an independent variable, Heitmann (1986), Bocksnick (1989), and Godin and associates (1988) investigated reasons for exercise involvement. All reported "health" to be the most closely related factor to exercise involvement. "Health", however, must be interpreted broadly as it encompasses the presence as well as the pursuit of it (Bocksnick).

Program providers need to be cognizant that to promote physical activity involvement only for people who are completely healthy would exclude the majority of the older age cohort because the majority has at least one chronic disease (Deobil, 1989). Failure to consider health debilitating aspects in the planning and the administration of programs may lead to older adults refraining from structured exercise programs (Barris, 1986; Jackson, 1988).

Placing greater emphasis on another factor in the interplay of exercise and health is to emphasize the role it can play in functional independence, which represents a special status for the older population (Bachman & Grill, 1987; Caspersen et al., 1986; Deobil, 1989). To increase the likelihood of long-term benefits, Deobil recommends greater efforts to educate older individuals about the adoption of activities which focus on the maintenance and the improvement of physiologic functioning to secure independent living.

Green (1987) and the National Advisory Council on Aging, NACA, (1989) also identify the role of self-responsibility and self-efficiency in health care. Older people are the main users of the health care system (Neysmith, 1988). Deobil (1989) reported an increase of 106%, over the past decade, in surgical admissions for individuals over the age of 65. She did, however, caution against a negative interpretation of this statistic by suggesting that this increment could also have reflected greater willingness of physicians to perform surgeries. Since a proportionately increasing cohort size will adversely affect the total health budget unless costs are reduced on an individual level, the promotion of preventive health care actions is justified (NACA, 1989).

Bachmann and Grill (1987) and Caspersen et al. (1986) identified structured exercise programs as an appropriate strategy for increasing overall exercise involvement. They also advocated that the medical profession should take a more assertive role in

prescribing regular physical activities and encouraging older individuals who tend to underrate their own abilities. This was supported by Lohr, Essex and Klein (1988) who reported that the majority of their subjects (N = 281 older women , age range 50-95) underestimated their physical capabilities which subsequently led to reduced levels of physical activity involvement. They concluded that passive acceptance of perceived physical conditions fostered beliefs and actions of impairment.

Physical health is the most frequently cited reason for both initiating exercise and refraining from exercise. Although lack of health may set limits to the type and intensity of involvement, it must not prevent involvement. According to a health assessment of 92 older participants in an exercise program (Howze, DiGillo, Bennett & Smith, 1986), 92% considered themselves to be in good to excellent health despite having arthritis or rheumatism (44%), hypertension (23%), and being overweight (64%). This suggests that individuals can be physically active within constraints, provided that the motivation to do so is present.

Potential influence of physicians on exercise behavior. The advice of physicians and other medical care givers is generally regarded highly by older adults (Chappell, Strain & Blandford, 1986; Fried, 1989). With respect to exercise, Thornton and Collins (1986), Myers and Gonda (1986), and Bachmann and Gill (1987) believe that the medical profession has made insufficient use of their potential motivating power. Only 5% of the exercise program participants in Howze et al.'s (1986) report indicated that they had received an activity-related recommendation from a physician. On the other side, more than 60% of the physicians in Ryan's (1983) study report having prescribed exercise for individuals suffering from anxiety or depression.

Physicians could greatly assist older adults in becoming more physically active by taking a more active role. Iverson, Fielding, Crow and Christenson (1985) report that one in four people rank the advice of a physician to be a sufficient reason for increasing exercise involvement. Caspersen and colleagues (1986) argue that activity can be prescribed just like any medication regarding type, frequency, duration, and intensity (see also Haskell, 1984, 1987). Some assertive suggestions from an accepted authority figure might be sufficient in encouraging older adults to increase their physical activity involvement (Myers & Gonda, 1986).

The importance of enjoyment to exercise maintenance. DeBenedette (1988) believes that health benefits from exercise are more important to seniors than to younger adults. It is always questionable, however, whether a behavior will endure unless it is also

associated with enjoyment (Myers et al., 1989). Without a sense of intrinsic motivation and enjoyment, any exercise activity is perceived as another stressor (Deci & Ryan, 1987) which, in turn, can negatively affect the state of well-being (Steinberg & Ritzmann, 1990). Being active just for the sake of it is an unlikely motivator, the behavior must also be purposeful and the time of involvement must be perceived as being of high quality (Zuzanek & Box, 1988). This is in agreement with DeCarlo's (1974) study on successful aging.

In an interview study, long-time exercisers rated enjoyment and health as equally important for their present exercise involvement (Bocksnick, 1989). The pursuit of maintaining or improving their overall health status was the primary reason for initiating exercise at an advanced age but not necessarily for maintaining it. In the Canadian Fitness and Aging Survey, Thornton and Collins (1986) reported the following reasons for exercise involvement: (a) enjoyment (48%), (b) good for me (41%), (c) for good health (42%), (d) pleasure (39%), (e) personal health and fitness (33%), (f) weight reduction (22%), (g) tension reduction (16%), and (h) challenging abilities (11%). Although one cannot distinguish between reports from short-term and long-term participants, it is obvious that health concerns and enjoyment levels are both of major importance. King et al. (1988) calculated a positive correlation between perceived enjoyment and regular exercise involvement ($r = .46$, $p < .01$) and consequently recommended a focus on enjoyable programs rather than on performance-oriented programs.

Enjoyment and an increased opportunity for social interaction were also found to be the main reasons for continued participation in the Fun and Fitness program of the Canadian Red Cross Society (Myers & Hamilton, 1985). It should be noted, however, that due probably to a limited exercise exposure of just once a week, the participants in the Fun and Fitness program did not experience a significant change in their physical condition.

Siegel, Johnson, and Newhof (1988) also concluded that creating an enjoyable, pleasant, and convenient environment should be more prominent than focusing solely on health-oriented outcomes. They investigated the adherence of 186 female college students to exercise classes. Using a discriminant analysis technique to investigate differences between adherers and dropouts, 63% of the variance between the groups was explained. The most significant factor was recreation in which "fun" loaded highest. This finding is in agreement with Wankel's (1985) suggestion of stressing a recreation-oriented approach in which fun and enjoyment play major roles to increase exercise adherence rates. Socializing and enjoyment are essential elements in the voluntary maintenance of the behavior and thus cannot be neglected.

Factors constraining physical activity involvement in older adults. Each individual attributes the decision to be physically active to various personal, environmental, and situational conditions (Dannenberg, Keller, Wilson & Casttelli, 1989; Dishman, Sallis & Orenstein, 1985). Birrer (1989) hypothesized that "despite the deleterious overall effects of aging on the body's ability to adapt and respond to physical activity, its capacity to improve performance through regular training is retained well into advanced age" (Birrer, 1989, p. 78). For older adults, however, the paradox of the relationship between participating in exercise and the intention to stay healthy, to feel good, and to be independent is partially confounded with stereotypical beliefs and attitudes (Mobily, 1982). Physical inactivity is often explained by a variety of misconceptions. Many older adults relate age to a decreasing need for exercise, a sufficient effect from very light and occasional activity, increased risk, and the perception of not being capable of exercise (MacNeil & Teague, 1987; McPherson, 1986; Mobily, 1982). Age-appropriate activity programs in which both the environment and activity options evoke an interest from the older population are thus necessary (Barris, 1986).

Many health-related changes are associated with age but the cause of this association is debatable (Frontera & Evans, 1986; Howze et al., 1986; Fitzgerald, 1985). These researchers suggest that a significant part of physiological decline is due to disuse and is therefore subject to modification. However, it is also true that an inevitable physiological restructuring occurs with age (e.g., contractility and elasticity of muscle fibers and blood vessels decline with age) (MacNeil & Teague, 1987; Shephard, 1986). Despite this, aging cannot serve as an excuse for inactivity because aging starts at birth (Frontera & Evans, 1986). The inevitable deterioration of certain physiological factors should not have an adverse effect on the decision to be physically active. Reasons, motives, and attitudes that lead the older adult to discontinue or to refrain from a physically active lifestyle must be explored (Meeks & Johnson, 1988). This knowledge may be critical for successful behavior modification interventions (Knapp, 1988).

### 2.1.2 Physiological Benefits

Physical fitness is a complex construct encompassing many different aspects such as strength, flexibility, endurance, and speed (Deobil, 1989). Optimal physical fitness is achieved when the individual is capable of meeting the physical challenges of daily living. These challenges also include self-selected activities which reach beyond survival needs, (e.g., swimming, golfing, or biking). A sub-optimal level of physical fitness results when the individual has to refrain from such activities. A brief discussion describing the relevance of several fitness-related factors for the older adult follows.

Training is characterized by doing physical work at a level exceeding the average work capacity so that for a limited time it is performed in a state of overload (Ribisl, 1984). Training effects are commonly measured as performance changes. Most relevant aspects of performance improvements are increments in maximum strength, endurance, or speed. Blumenthal et al. (1989), Haskell (1987), and Shephard,Montelpare, Berridge, and Flowers (1986) are convinced that older adults possess the potential to attain training benefits similar to those of younger adults. Improvements, however, must be equated with reaching an age-related optimal level of physical fitness rather than maximizing performance.

Several authors (McPherson, 1986; Shephard, 1987; Shephard et al., 1987) report gains and losses in the physical fitness levels of exercising and sedentary seniors, respectively. Unfortunately, the majority of the reports depict the detriments rather than the benefits of exercise. It should be stressed that in older adults the degenerative changes are largely caused by disuse of functional capabilities (Frontera & Evans, 1986). With increasing age, the "average" adult decides to avoid more and more physical challenges, which in turn may lead to permanent immobility. Frontera and Evans (1986) and Vellas et al. (1987) report negative consequences from extended periods of reduced activity involvement of fall victims who are briefly immobilized. Just as such patients must be encouraged to return to their previous activity level as early as possible to minimize long-term negative effects, so should adults be encouraged to retain physically active lifestyles as a matter of health promotion.

Cardiovascular fitness is a result of regular exercise involvement at an appropriate level of intensity (Kannel & Sorlie, 1979; Paffenbarger, Hyde, Wing & Hsieh,1986; Salonen, Slater, Tuomilehto & Rauramaa, 1988). Blair, Brill, and Kohl (1989) and Pollock (1989) feel that many older adults are involved in physical activities at levels that are too moderate to maintain or improve cardiovascular response efficiency, which results in an overall loss of cardiovascular resources. It should be noted that an increase in cardiovascular efficiency has been evident even at levels of exercise intensity (50% to 66% of peak baseline $VO_2$max) which are generally considered too low for improvements (King et al., 1988). This is a very encouraging finding, particularly for individuals of advanced age who generally dislike physically strenuous exercise regimens (Myers et al., 1989) and prefer to exercise at a lower intensity. Physiological changes, though, may occur less rapidly than they do when exercising at a higher frequency and intensity. Myers and Gonda (1986) argued that for untrained, unfit, and inactive individuals, exercise at an intensity of 30% to 60% of $VO_2$max may result in significant improvements. More important than the level of intensity is the regularity of involvement. Occasional walks are

insufficient to obtain satisfactory levels of cardiovascular fitness (Brown,1987; Himann, Cunningham, Rechnitzser & Paterson, 1988).

In conclusion, the most important findings with respect to older adults in the area of exercise physiology are that older people can exercise safely; and they can experience gains in various physiological domains such as cardiovascular efficiency, strength, and flexibility (Haskell, 1987). Age is frequently held responsible for the decline in cardiovascular response efficiency. Because appropriate training regimens can lead to improvements, regardless of age, age should not be considered the cause.

### 2.1.3 Psychological Benefits

The interdependence between activity involvement and psychological variables is consistent across studies — increased physical activity involvement is positively associated with life satisfaction, well-being, and enjoyment (Gauvin, 1989, 1990; Mancini, 1978, Ross & Hayes, 1988; Wankel & Berger, 1990); it is negatively related to anxiety and depression (Crews & Landers, 1987; Greist, Klein, Eischens, Faris, Gurman & Morgan, 1979; Martinsen, Hoffart & Solberg, 1989; Labbé, Welsh & Delaney, 1988, Sime, 1987).

The associations between health, well-being and a physically active lifestyle have been the focus of many research endeavors (Larsen, 1978; Lawton, 1983; Sloan, 1989; Stull, 1988; Taylor & Brown, 1988). Lawton (1983) considered well-being in older people as an array of interdependent domains encompassing a perception of well-being rather than a specific domain positively related to physical activity involvement. Taylor, Sallis, and Needle (1985), Stephens (1988), and Taylor and Brown (1988) found a reciprocally reinforcing relationship between well-being and activity involvement. They also suggested looking beyond a simple consideration of energy expenditure in explaining the psychological benefits from physical activity involvement. "It should not be surprising if an essentially psychological dimension must be adopted to the physiological prescription of exercise" (Stephens, 1988, p. 45). Empirical evidence of the positive relationship between physical activity and well-being is reported by Elrick (1989); Israel and Antonucci (1987); Mellor and Edelmann (1988); Ray and Heppe (1986); Ross and Hayes (1988); and Stones, Kozma, and Stones (1987). All of these researchers reported an improved state of well-being for people who are more physically active and remarked on how the perceived quality of an activity contributes positively to satisfactory feelings (that is, just being active does not necessarily result in an improvement of well-being). For example, participation in passive activities (e.g., watching television, listening to the radio, etc.) contributes less to positive feelings than does active participation (e.g., going for walks, participating in an art

program). Despite the quantity of involvement in passive activities, they are not positively related to life happiness (Ray & Heppe, 1986).

For older adults to become more physically active, greater emphasis must be placed on restoring their belief in their own ability. Older adults generally underrate their abilities, particularly in the physical domain (Bachman & Grill, 1987; McPherson, 1986; Morrisey & Baldwin, 1987). Morrissey and Baldwin (1987) hypothesize in a review article that it is important to provide assistance to older adults in generating positive self-evaluative cognitions. MacNeil and Teague (1987) agree, "One of the most devastating attitudes an older person can have is that physical deterioration leading to total incapacitation is inevitable" (p. 93). Experts in motivation theory have hypothesized that loss of belief in the controllability of behavior and behavior outcome increases the tendency to withdraw from an activity (Bandura, 1989; Deci & Ryan, 1985a, 1985b, 1987).

According to geriatric nursing research (Langer, 1989; Morrisey & Baldwin, 1987; Rodin & Langer, 1977, 1980; Thompson, Crist, Marsh & Rosenthal, 1988) older adults tend to benefit psychologically from an exercise program as long as they believe that they are in control of their action. Appropriate age-related exercises have triggered improved self-esteem, better emotional well-being, better body image, increased belief in controllability of personal life, and greater sociability.

### 2.1.4 Summary

Research has provided evidence for a multidimensional legitimation of sport and exercise involvement for older adults (Haskell, 1987; Shephard, 1989; Sloan, 1989). The biological aging and simultaneous degeneration of physiological functions that are inevitable can be minimized if individuals deliberately engage in physical challenges (McPherson, 1986). Health is the single most important issue in the life of older people, and many activities including the initiation of exercise center around this issue (Heitman, 1986; Myers et al., 1989; Ribisl, 1984). The physically active older adult wishes to positively affect current physical health through regular exercise involvement. At the same time, physical activity involvement also appears to positively affect psychological well-being.

Physical activity involvement for the older adult is socially more acceptable today than it was ten years ago (McPherson, 1983). In fact, to be active and to be fit has also become a social norm for older adults. From both physiological and socio-psychological perspectives, age cannot be regarded as a barrier that inevitably leads to exercise abstinence.

## 2.2 Adherence

Sackett defines compliance/adherence as "the extent to which a person's behavior (in terms of taking medications, following diets, or executing lifestyle changes) coincides with medical or health advice" (in Oldridge, 1988a, p. 76). Adherence is critical in determining the efficacy of any intervention (e.g., exercise, weight reduction, or smoking cessation program). Unfortunately, adherence rates to preventive health care behaviors are less than desirable (Dishman, 1989) — fewer than 60% of those that enter a health-related preventive treatment adhere to the regimen and far less than 50% comply with recommendations focusing on more complex lifestyle changes (Hays & DiMatteo, 1987).

### 2.2.1 Exercise Adherence Rates

Adherence rates to structured exercise programs have varied from 0% to 100% (Franklin, 1988). In general, the research indicates adherence rates of approximately 50% if a program: (a) is any longer than six months, (b) targets a non-specific general population, and (c) does not provide any particular incentives to improve adherence.

Exercise compliance has been found to be comparable to medical or dietary compliance (Dishman, 1987). The majority of people who voluntarily start an activity program do not complete it even when they are aware of the potential positive outcomes from regular exercise. Even individuals who are susceptible to coronary heart disease and who could benefit most from regular activity involvement are not more likely to stay involved than anyone else (Dishman, 1982; Oldridge & Jones, 1983). This is surprising since scientific evidence has been very supportive of the rehabilitative and preventive effects of appropriate exercise. Oldridge and Jones reported that only every other cardiac patient who started an exercise rehabilitation program adhered to it after twelve months. This attrition rate has been accepted as representative for most exercise programs (Oldridge & Stoedfalke, 1984; Daltroy & Godin, 1989; Dishman, 1987; Wankel, 1988a). Daltroy (1985) reported an attrition of 50% for cardiac patients after just twelve weeks; only 10% of those who started still attended the twelve-month program at its end. The small number of compliants, even in light of severe detriments from exercise abstinence, is alarming.

### 2.2.2 Adherence Correlates

Franklin (1988) and Pollock (1988) regard adherence to a structured exercise program to be a function of personal and situational components. Personal components include age, gender, physical health, attitudes, beliefs, or interests (see also Godin et al., 1988; Hickey, Rakowski & Julius, 1988). Situational components are reflected in

environmental conditions, including intensity and duration of an activity, as well as convenience, accessibility, and costs of an activity (see also Barris, 1986; Jackson, 1988, 1990). The following discussion will outline the importance of perceived choice, intrinsic motivation, and health to the exercise adherence of older adults.

Perceived choice. An individual's perception of whether or not participation is under volitional control is important to adherence (Deci & Ryan, 1987; Thompson & Wankel, 1980). Perceived freedom in making a decision to participate positively affects adherence to exercise (Thompson & Wankel, 1980). Noncompliance reflects a legitimate display of an individual's right to self-determination (Coy, 1989). Coy therefore recommends that health care practitioners, such as physicians, community health nurses, or physical educators, avoid the development of aversive reactive feelings in clients by including them in the decision-making process. The goal is to foster the autonomy of a client to make self-responsible preventive health care decisions (Coy, 1989).

Intrinsic motivation. Other influential factors which have been shown to be important to activity involvement are the individual's feelings of enjoyment or intrinsic interest in an activity (Wankel & Berger, 1990; Wankel & Sefton, 1989), of competence, and of striving for an optimal challenge (Csikszentmihalyi, 1985; Deci & Ryan, 1987; King et al., 1988). Essential for the development of a feeling of "liking", which in turn could instigate "doing", is a balance between challenges of an activity and skills of the participant (Csikszentmihalyi, 1985). King and associates (1988) agree, "The adoption of a new health behavior such as physical exercise requires the mastery of new skills" (p. 631). King and colleagues also reported significant correlations between perceived enjoyment and duration and frequency of exercise. They concluded that "liking an activity" was a significant contributor to adherence.

Health. McPherson (1986), Morse (1988), and Vellas and associates (1987) identified failing health to be among the most prominent factors related to withdrawal from exercise. To support this, self-reported illness was negatively associated with adherence rate to a walking schedule in a long-term study of 229 postmenopausal women (Kriska et al., 1986). Subjects were directed to walk a minimum of 7 miles/week and to record their actual mileage on monthly log sheets. "Not only did the women have to be active participants in the program, but they also had to maintain a defined exercise level (7 miles of walking/wk) for a 2-yr period in order to be classified as a complier" (p. 561). Sixty-one percent of the exercise group complied with the regimen and demonstrated a 79%

increase in walking. On the other side, non-adhering subjects reported a significantly greater amount of sick-days. It should be noted, however, that at the onset of the study, adherers tended to be leaner and non-smokers.

The health-promotion of exercise and nutrition practices has been challenged with the need to modify established habits (Carmody, Matarazzo & Istvan, 1987). The difficulty lies in the fact that habits are maintained because they are familiar, liked, and enjoyed. Analogous to dieting, exercise-promoting interventions focus on the modification rather than the extinction of a behavior. Elrick (1989) interprets the main challenge for a behavioral treatment to be resistance of habitual behaviors. "In addition to cognitive-attitudinal and interpersonal factors, the totality of the individual's food [exercise] environment, from the family and community to the culture at large, also affects the way he or she eats [acts]" (Carmody et al., 1987, p. 113)

Adherence is process-oriented and dependent on the perceived freedom of choice. Fitness-related factors may not be the sole factors discriminating between compliers and dropouts (Wankel, 1988a). Commitment to regular exercise is positively related to non-smoking, higher education, higher socioeconomic status, sociability, and above average health knowledge (Godin et al., 1988). Participation in vigorous activity is proportionally less for the older age cohort than for the younger one, which may be attributed to a greater prevalence of restrictive health conditions among older adults (Herbert & Teague, 1989).

### 2.2.3 Adherence Strategies

Intervention strategies of various kinds have been utilized to improve exercise adherence. Individually, or in combination, self-monitoring, reinforcement, establishment of a social support system, using low intensity activities, goal setting, completing a decision-balance sheet, relapse strategy, phone contacts, written information dissemination, and perceived choice enhancement have been used successfully (Bélisle, Roskies & Lévesque, 1987; Daltroy, 1985; Daltroy & Godin, 1989; Hoyt & Janis, 1975; Levy, 1986; Martin, 1984; Noland, 1989; Oldridge, 1988a; Owen, Lee, Naccarella & Haag, 1987; Sallis, Grossman, Pinski, Patterson & Nader, 1987; Thompson & Wankel, 1980; Wankel, 1985; Wankel, 1988b; Weber & Wertheim, 1989). Self-monitoring, social support system, relapse prevention, written information, and multimodal interventions are most relevant for the adherence to exercise.

Self-monitoring. Self-monitoring has played a major role in studies focusing on self-initiated exercise (Bélisle et al., 1987; Juneau et al., 1987; King et al., 1988; Kriska et

al., 1986; Noland, 1989; Wankel, 1988a). In all cases, the subjects recorded pertinent behaviors and submitted these records on a regular, daily, weekly, or biweekly basis. Noland (1989) reported that the behavioral interventions of self-monitoring and reinforcement through a third person did not add significantly to the exercise adherence of subjects who were already physically active; both strategies, however, improved exercise adherence in previously inactive individuals. Noland's finding indicated the importance of distinguishing between novice exercisers and experienced exercisers in evaluating the efficacy of an intervention.

King and colleagues (1988) investigated the adoption and maintenance of home-based exercise in middle-aged adults. Evaluation of the treatment conditions was based on self-reports and changes of physiological parameters during both the adoption and maintenance phases. Baseline instruction and personal contact were advantageous for the adoption of exercise behavior and self-monitoring was shown to be a sufficient stimulus during the maintenance phase.

Social support. The effect of direct and indirect support from significant others on exercise adherence has been scrutinized in several research studies (Levy, 1986; Daltroy & Godin, 1989; Sallis et al., 1987; Wankel, Yardley & Graham, 1985). Levy (1986) used the framework of social learning theory to postulate how "significant others" are able to influence the transmission of beliefs, motives, and behaviors. He described the process as dynamic because the social support from a significant other cannot be regarded as being consistent over time. This view also received support from Daltroy and Godin (1989). In their study the perception of what social support was and how much of it was needed varied between individuals and within the same individual over time. The authors argued that individuals perceived as important, relevant, and influential could be considered as providers of social support. The perceived importance of various sources of social support have also been investigated by Wankel and associates (1985). Leader support, in-class buddy support, and general class support were all beneficial in helping individuals to adhere to an exercise program.

Utilizing different levels of interpersonal skills, Weber and Wertheim (1989) demonstrated the positive effects of social support. In a three group design, differential effects of three treatments were investigated (i.e., Group I: self-monitoring of gym-attendance, Group II: self-monitoring of gym-attendance plus extra staff attention, and Group III: control). Subjects in the control group attended the gym significantly less than subjects from the other two groups. There were no significant differences in the attendance rates for the two experimental groups. These effects were attributed to the general

friendliness of staff members. Program evaluation forms revealed that the participants perceived that staff had positive attitudes towards participants, provided active encouragement of participants, and demonstrated genuinely caring predisposition towards participants. This is consistent with Eggers' (1988) emphasis on the importance of caring leaders. His conclusions were based on a comparative study of 28 physically active and 28 physically inactive seniors (age range 65 years to 91 years) in a seniors' community. He concluded that a caring activity director or exercise leader can be very influential in encouraging and assisting older adults to make activity-related decisions.

Relapse prevention. Marlatt (1985) developed a relapse prevention strategy to assist clients in avoiding a return to previous alcohol, smoking and/or drug behaviors. Bélisle et al. (1987) implemented the same strategy to study the behavior of participants in ten-week exercise programs. During the fitness class, exercise leaders disseminated information on how to avoid a relapse to inactivity. All participants were then monitored for 12 weeks after the termination of the specific exercise programs. Adherence rates were only marginally better for the experimental group when compared to the control group. The small gains, however, were considered worth the effort because of the strategy's inexpensive modality.

Daltroy (1985) tested the cost-effectiveness of a similarly oriented health education compliance enhancing strategy. Within 12 weeks of the start of the program, 50% had dropped out. At the end of the one-year period, attendance was down to less than 10%. Despite a 2% higher compliance rate among members of the experimental group, it was impossible to detect whether they really exercised more. The search for a low cost and highly effective adherence-enhancing treatment is still under way. "Instead of searching for a single, perfect treatment, it may be more profitable to use a variety of low cost interventions and evaluate each one in terms of its cost-benefit ratio" (Bélisle et al., 1987, p. 170).

Written information. Levy (1986) conditionally suggested utilizing written information in treating health behaviors. Although multimodal behavioral strategies have been effective in increasing adherence rates, they have been labor and cost intensive. Cost-effectiveness, however, is a major concern when a treatment is designed for a large scale application. Written information would be far more cost-effective if a similar treatment effect could be obtained. Unfortunately, written messages can be expected to have an effect on the behavior only if the readability of the information is optimized so that the target group can consciously and subconsciously absorb, process, and recall health-related

messages. Owen et al. (1987) tested the effectiveness of a mailed self-instructional program for aerobic exercise. The recipients of exercise-related information were physically more active than subjects from a control group, however, they were less active than participants in a fitness class. In a ten-month follow-up assessment no statistically significant differences were evident.

Multimodal intervention. King et al. (1988) studied the effect of a multimodal intervention strategy during the initiation and maintenance of home-based exercises in middle-aged men and women (N= 103, mean age for men was 49 and for women 47). All subjects received an instructional session at the beginning of the study which focused on ways to increase control over exercise behavior and to cope with high risk situations. The experimental group received additional attention through biweekly phone contacts (5 minutes each). Personal contact was successful during the adoption of exercise, while self-monitoring of activity involvement was sufficient during the maintenance phase. The authors concluded that adherence strategies should probably vary according to a subject's exercise history. They also suggested that interventions should focus on convenience and enjoyment of exercise since these factors significantly influenced both adoption and maintenance of exercise behavior.

Adherence to health-related behavior reflects an ongoing complex decision-making process (Dishman, 1989; Knapp, 1988; Oldridge, 1984). The authors speculate that personal expectancy orientation of possible long-term benefits affects the behavior. "Compliance with exercise is a complex behavioral phenomenon in which the psychosocial, clinical, and physiological components, in conjunction with previously mentioned observations on treatment logistics, depend on each other to varying degrees in different individuals" (Oldridge & Stoedfalke, 1984, p. 444). The recommendation of a multimodal treatment package has been an inevitable consequence with the main disadvantage being quantifying differential contributions of specific treamtent elements and the main advantage being increasing flexibility in adjusting treatments to the needs of individuals.

The utilization of complex adherence strategies for behavior acquisition have also been favoured by Martin (1984). In a series of six studies, exercise adherence was enhanced through social support, personalized feedback, group/social setting, flexibility in goals, and cognitive dissociation. Perri, McAllister, Gange, Jordan, McAdoo, and Nezu (1988) evaluated the effectiveness of five treatment groups of different complexity in relation to weight loss. Subjects exposed to a combination of treatments had significantly greater long-term weight losses when compared to subjects exposed to behavior therapy

only. Thirty-three percent of the subjects who did not receive a post-treatment maintenance program maintained their new weight. However, there was no significant difference in weight loss among those who received a combination of treatments[1]. The authors attributed greater efficacy to the multifaceted approach when compared to the unifaceted approach while not being able to determine an optimal combination of individual treatment components. Similar success with multiple intervention procedures were also reported by Kallio, Hämäliänen, Hakkila, and Luurila (1979). After myocardial infarction, subjects who were treated with exercise, health education, and psychosocial counseling showed significantly reduced recurrence rates. Kriska and colleagues (1986) provided a multimodal support system to help subjects reach the goal of walking at least seven miles per week for a two year time period — frequent social gatherings were held; personal contact was established to provide encourgament on an individual basis; buttons were awarded to reinforce the walking; and the subjects submitted monthly exercise sheets. Subjects in the experimental group increased their walking by 79% whereas subjects in the control group (self-reports only) had an increase of 16%. The researchers considered that the advice to be "physically active" should be qualified and quantified in order to reflect the complexity of a lifestyle change.

### 2.2.4 Summary

In conclusion, the exercise adherence problem has extended beyond adherence to a structured program to involve adherence to a physically active lifestyle (Martin & Dubbert, 1985). Adherence to regular exercise is a part of a healthy lifestyle, which is synonymous with preventive health care. The problem in investigating lifestyle changes is monitoring the change. Martin and Dubbert evaluated self-monitoring as susceptible to expectations and experimenter/subject bias, inaccuracy and deliberate misinformation. Although the real issue has been the individual's change to a more physically active and healthier lifestyle, the problem for the researcher has been the inability to unobtrusively monitor these changes. The problems have been similar in dietary research. Exercise or dietary intake "is generally not amenable to any direct method of assessment" (Carmody et al., 1987, p. 107). A realistic and positive perception of one's ability to initiate , perform, and succeed in exercise is a requirement to self-determined, self-initated exercise behavior (Bandura, 1982;

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[1]The treatment groups were (a) behavior therapy only, (b)behavior therapy plus a posttreatment therapist-contact maintenance program, (c) behavior therapy plus posttreatment therapist contact plus a social influence maintenance program, (d) behavior therapy plus posttreatment therapist contact plus an aerobic exercise maintenance program, and (e) behavior therapy plus posttreatment therapist contact plus both the aerobic exercise and social influence maintenance program.

Deci & Ryan, 1985a). Walker, Volkan, Sechrist & Pender, (1988) suggested that individuals who are lacking in these areas and could not experience their potential, could probably be helped by individual counseling strategies. A greater individualization of adherence enhancing strategies has been recommended (King et al., 1988; Siegel, et al.,1988; Wankel, 1988b). Individuals must be assisted and challenged to reach their potential while considering their level of capabilities and other constraining factors. Since no one strategy has proven to be superior, the solution might be the implementation of multifaceted interventions.

## 2.3 Counseling

Egan (1982) describes counseling as the art of helping individuals to resolve their own problems. When applied to a certain context (e.g., weight loss, smoking cessation, exercise adherence), counseling is a goal-oriented technique. In determining the efficacy of any counseling approach both methodological and content-related idiosyncracies deserve equal evaluation. Methodological concerns remain relatively consistent because they deal with the process of counseling. On the other side, content-related issues focus on specific knowledge that is relevant to a target behavior.

Counseling means helping by increasing a client's awareness of the relations between situations and people. "The therapist and client discuss the responses, and the therapist assists the client in devising ways to avoid or cope with the negative consequences of the desired behavior change and reducing positive outcomes of failure or providing alternate means of attaining such outcomes" (Knapp 1988, p. 208). The client should be assisted in evaluating past behavior in terms of the present (Webster & Young, 1988). The counselor assists the client in recalling and evaluating his/her previous behavior before lending support in generating new behavioral motives and intentions. The supreme objective of the counseling process is to guide a client to recognize and to use alternatives (Janis, 1983).

### 2.3.1 Short-term counseling

Short-term counseling is a structured procedure that attempts to develop a mutually accepted relationship between client and counselor (Janis, 1983). Janis, who developed the strategy, based it on French and Raven's (1959) theory of social power. He found that a counselor's potential for helping was considerably improved if the counselor was accepted by the client as a dependable, likable, and knowledgeable person. French and

Raven referred to this condition as referent power; it is viewed as the most effective form of motivating power.

According to Janis (1983), the development and use of referent power in a counseling situation must be deliberate and planned. He found that the probability of a behavior change occurring increased when counselors followed the following three-stage approach for the acquisition and use of motivating power.

Phase 1: Building up motivating power
1. Encouraging clients to make self-disclosures *versus* not doing so.
2. Giving positive feedback (acceptance and understanding) *versus* giving neutral or negative feedback in response to self-disclosure.
3. Using self-disclosures to give insight and cognitive restructuring *versus* giving little insight or cognitive restructuring.

Phase 2: Using motivating power
4. Making directive statements or endorsing specific recommendations regarding actions the client should carry out *versus* abstaining from any directive statements or endorsements.
5. Eliciting commitment to the recommended course of action *versus* not eliciting commitment.
6. Attributing the norms being endorsed to a respected secondary group *versus* not doing so.
7. Giving selective positive feedback *versus* giving noncontingent acceptance or predominantly neutral or negative feedback.
8. Giving communications and training procedures that build up a sense of personal responsibility *versus* giving no such communications or training.

Phase 3: Retaining motivating power after contact ends and promoting internalization
9. Giving reassurances that the counselor will continue to maintain an attitude of positive regard *versus* giving no such reassurances.
10. Making arrangements for phone calls, exchange of letters, or other forms of communication that foster hope for future contact, real or symbolic, at the time of terminating face-to-face meetings *versus* making no such arrangments.
11. Giving reminders that continue to foster a sense of personal responsibility *versus* giving no such reminders.
12. Building up the client's self-confidence about succeeding without the aid of the counselor *versus* not doing so.

Janis (1983, p. 27)

### 2.3.2 Components of Short-term Counseling

The first two phases of Janis' (1983) short-term counseling, building up motivating power and using motivating power, are described in the following section. Scientific contributions to the third stage, retaining motivating power, are negligible. There has been no separate evaluation of this particular aspect, although several researchers (Juneau, et al.,

1987; King, et al., 1988; Kriska, et al., 1986; Owen et al., 1987; Perri, et al., 1988; Wankel, 1988b) have implemented post-intervention strategies (e.g., possibility for future contacts, mailing of reminders).

Building up motivating power. Researchers agree on the need to establish referent power, a positive relationship built on trust (Egan, 1982; Gross, 1988; Janis, 1983). Counselors with referent power have a greater chance of helping clients reach a content-related goal (Janis, 1983). Research reports, however, have rarely reported the means for establishing referent power. "Phone contact", "personal contact", or "staff attention" have been common descriptors used but they are general and vague to the reader (Bélisle et al., 1987; Daltroy,1985; King et al., 1988; Kriska et al., 1986; Weber & Wertheim, 1989).

Bélisle et al. (1987), Daltroy (1985), King et al. (1988), Kriska et al. (1986), and Weber and Wertheim (1989) gave a general but positive evaluation to the use of phone contact as a means of establishing personal contact, however, their focus of research was exercise adherence. Hoyt and Janis (1982), who concentrated on establishing referent power as a methodological aspect of counseling, found phone contact was insufficient in providing the interviewer with the opportunity to establish referent power.

Hoyt and Janis (1982) argue that counseling style plays an important role in how clients respond. Moderate requests for self-disclosure in the counseling situation result in greater referent power for the counselor than requests that are either too high or too low (Janis, 1983). In fact, Riskind and Janis (1982) reported that requests for high self-disclosure led to resentment and negative reactions in subjects. In an experimental study, the differential effect of high versus moderate levels of self-disclosure was investigated. High self-disclosure was requested by asking the client to describe the major problems in her life at that time. Moderate self-disclosure was evoked by asking general questions on whether or not there was anything else the client wanted to inform the counselor about. Subjects who were exposed to moderate self-disclosure questions demonstrated greater weight loss than did those exposed to high self-disclosure questions. Questions requiring high self-disclosure from clients did not trigger the expected responses of improving self-esteem, self-confidence, and a belief in being successful.

There is potential for modifying health-behavior in the desired direction when positive feelings exist towards the behavior (Rogers, 1989). Webster and Young showed that a client's preferences and abilities should be acknowledged when assisting in the decision-making process. They also recommended a "life review process" to reveal more global information on issues pertinent to the adoption of a healthy lifestyle. Through this, a balance between experiences and expectancies can be pursued (Webster & Young) to

accommodate the dynamics of an individual's behavior. Together, the individual and the counselor should first analyze previous behavior and then synthesize behavioral alternatives. "Human self-management consists of nothing less than the processes by which the individual controls the sources of variation in his or her own behavior. The sources of variability can be cognitive, affective, biophysical, chemical, or environmental, and all are time bound and context specific" (Karoly, 1983, p. 27). Social learning theory has provided a theoretical basis that has incorporated an array of influential factors (Bandura, 1982, 1989). Behavior is more than just an operant or a conditioned response, it is the result of learning in a social environment. A specific behavior should not be considered discrete, but rather it reflects an integral element in a chain of behaviors which have been acquired over time (Karoly, 1983; Bandura, 1982). The objective of health counseling for older adults should be to maintain and foster self-responsibility concerning preventive health care actions (NACA, 1989). While social learning theory has provided an appropriate theoretical approach for life-long learning within a social environment, counseling is a tool to make behavioral changes possible (Munson & Munson, 1986).

Using motivating power. The methodological strength of short-term counseling lies in its flexibility for application (Janis, 1983; Wankel, 1988). Procedures such as completing a decision balance-sheet, setting up a contract and signing a statement of intent, or generating short and long-term goals have all been successfully incorporated into studies which targeted health behavior adherence (Hoyt & Janis, 1975; Martin & Dubbert, 1982; Oldridge & Jones, 1983; Wankel & Thompson, 1977).

Goal-setting is a fundamental part of human behavior (Bandura, 1989). Wood, Mento, and Locke (1987) demonstrated that the setting of goals was more influential in reaching simple task objectives than in reaching complex task objectives. Genest and Genest (1987) and Bandura (1989) showed, however, that goal-setting can also be a critical element in bringing about a change in complex behaviors.

Another effective tool for motivating behavioral changes has been the provision of individualized and immediate feedback (Wankel, 1988b). Personal contact is used by the counselor to help the individual understand and accept the phenomenon of delayed and varying benefits from regular exercise. Such knowledge should assist the client in long-term exercise adherence.

Many novice exercisers feel overwhelmed when making decisions about what kind of activity to select, how often to exercise, and how to exercise — all of which are issues which could be addressed through counseling (Knapp, 1988). The probability of successful behavior attainment is then greatest when subjects have positive and realistic

perceptions of their self-efficacy (Bandura, 1977, 1982) and a belief in behavioral autonomy (Deci & Ryan, 1987).

The modification of a lifestyle pattern requires personal self-management which goes beyond the adherence to specific advice. Individuals have to make their own decisions on what to do or not to do (Karoly, 1983). Counseling can help individuals adopt strategies which are helpful to a conscious decision-making process. The goal of counseling is to stimulate a dialectic approach towards the analysis of a mutual relationship among situation, environment, and personal abilities and goals.

Munson & Munson (1986) described a counselor's primary role as raising the clients' efficacy expectations. Since fear of failing has prevented many older adults from trying, counselors should foster the development of positive feelings about one's own ability to successfully deal with a task. Similarly, the counselor should help older adults realize likes and dislikes and how to go about changing the dislikes to likes. Generally, "ineffective behavior patterns developed over a life span do not magically disappear as one reaches the age of 65" (Gross, 1988, p. 6). Both attitude and behavior changes need to be fostered.

Backman and Mannell (1986) conducted a field experiment in a total care senior citizen's facility. The subjects (N = 40, age range 65 to 87 years) were exposed to one of three treatments: counseling regarding leisure activity involvement, attending a leisure activity program, or both. The objective was to develop and increase (a) awareness of attitudes, (b) greater competence in decision-making, and (c) problem-solving skills. The results suggested (a) simply an attitude change is insufficient for a behavior change, (b) the greatest increase in active participation and perceived satisfaction from participation should be expected from a multimodal treatment, and (c) improving an individual's perceived satisfaction without increasing the quantity of participation is possible.

### 2.3.3 Age-related Issues in the Counseling Process

Gross(1988) and Rimmer and Myers (1982) identified that although older and younger adults respond similarly to counseling, certain age-related aspects of older adults (e.g., shortened attention span of clients, hearing problems, etc.) deserve special consideration. Rimmer and Myers also argued that in order to be successful, counselors must have a belief in the potential development and growth of this population. "There is no evidence that counselors as a professional group are immune to the ageist attitudes that are an unfortunate part of U.S. culture" (Blake, 1982, p. 188). Despite the generalizability in applying counseling techniques, older adults represent a special population and demand special consideration (Egan, 1982; Gross, 1988; Janis, 1983; Rimmer & Myers, 1982).

Gross (1988) emphasizes that age-related idiosyncracies of older adults require more time and patience to gain trust, which could have a negative effect on the establishment of a positive relationship (Rimmer & Myers, 1982). For example, old-age prejudice, sudden fatigue of the client, increased anxiety, or changed life circumstances can all be detrimental in counseling situations (Gross, 1988; Rimmer & Myers, 1982). Differing cultural, environmental and value orientations among clients are also identified as factors that deserve the counselor's attention and preparation. To alleviate these concerns, frequent but shorter counseling sessions, allowing sufficient time to develop a trust relationship, and providing subjects with the opportunity to recover from individual sessions are recommended.

Older adults who acted as clients (N = 96, mean age = 69.6) were counseled by both older and younger counselors, on an intimate topic (marital problems) and a less intimate topic (effective use of free time) (Hayslip et al., 1989). The results suggested that the age difference between counselor and client was not perceived negatively by the clients. Regardless of the counselors' age, the subjects reported greater satisfaction with the counseling of the less intimate topic. Younger counselors, however, were preferred when more intimate problems were discussed. Hayslip and colleagues also concluded that the perceived expertise of the counselors is far more of an issue than age. Subjects tend to judge counseling effectiveness on factors uniquely related to each individual counselor. To generate a positive relationship, the counselor must be aware that "skills in rapport building, active listening, the ability to demonstrate caring, support, respect, and acceptance are as applicable to the client of 8 as the client of 80" (Gross, 1988, p. 3).

Tracey, Hays, Malone, and Herman (1988) noted a positive association between counseling effectiveness and counselor experience. In a comparative study of novice and experienced counselors (N = 67), greater counseling experience was associated with higher levels of confrontation and immediacy, which are considered positive attributes of effective counseling (Tracey et al., 1988). Less counseling experience, on the other hand, was associated with rigid and inflexible applications of skills. The efficacy of the counseling was most affected by the flexibility of the counselors to adapt to a variety of contexts, and it was least affected by response rate of the counselors. These findings are contradictory to those of Nagel, Cimbolic, and Newlin (1988), who found empathy-trained counselors did not differ significantly from counselors who had only received information on the aging process. Both groups were, however, different from a control group who did not receive either forms of training. The authors concluded that with the necessary knowledge on age-related aspects, a lay person could develop the interpersonal skills necessary to offer effective help (Nagel et al., 1988). A client - counselor relationship based on genuine

warmth and empathic understanding is facilitative for the counseling process, regardless of existing differences in age, gender, professional experience, or content (Egan, 1982; Janis, 1983; Nagel et al., 1988).

Gross (1988) has cautioned that the elderly tend to have negative reactions when it comes to "seeking counseling". It is therefore important to encourage older adults to overcome their fear to accept help and to assist restoring self-esteem and a belief in behavioral autonomy (Gross, 1988; Deci & Ryan, 1987). To reach this goal, Gross suggests it is necessary to thoroughly understand the normal aging process and behavior influencing aspects. Active listening and the ability to adapt to the older client's needs have been perceived as critical for success in such counseling situations. "This active/doing role allows the counselor not only to demonstrate the positive aspects of counseling but also to be an advocate" (p. 4). Sterns, Weis, and Perkins (1984, p. 57) summarized the objective of counseling older adults by saying "a guiding principle is to preserve the autonomy of older adults and to support them in making decisions which can promote competence and independence as much as possible".

2.3.2 Summary

Counseling takes place within a contextual framework (Kagan et al., 1988). The client and his/her specific problem are not free of cultural, social, environmental and experiential influences. To reach the ultimate goal of empowering individuals to master their own lives, they must be made aware of behavioral shortcomings and possible ways of modification (Kagan et al., 1988; Knapp, 1988).

Intrinsic motivation is crucial for the long-term adherence to any behavior (Deci & Ryan, 1985, 1987). Exercise behavior is no exception. In agreement with Janis' (1983) and Egan's strategies, Oldridge (1988b) recommends three steps to improve long-term adherence to exercise behavior: first, the individual should be helped to define realistic objectives concerning physical fitness; second, the individual should be assisted in generating realistic strategies for achieving these objectives; and third, the individual should be guided towards improving self-efficacious beliefs. Janis' short-term counseling emphasizes the development of self-directed decision making, free of extrinsic rewards, to prepare the individuals for the time following the termination of the counselor - client interaction.

## 2.4 Methodological Concerns

### 2.4.1 The Assessment of Physical Activity Behavior and its Effect

Quantitative analyses, utilizing multivariate statistics, may be appropriate for the investigation of certain research questions but qualitative analyses, utilizing a case study approach, is superior for studying other questions (Locke, 1989; Sage, 1989). Research cannot become a pawn of methods and procedures; research questions and intentions must determine methods and analyses. No generic method or design for innovative research exists. Several methodological concerns have impact on this study.

Although prior to the Campbell's Survey (Stephens & Craig, 1990) the statistics of regular exercise involvement for the senior population were disappointingly low, McPherson (1986) noted a trend towards a more physically active lifestyle. Brooks (1988), Caspersen et al. (1986), and McPherson (1986) reported that only an estimated 10% to 20% of older adults were sufficiently active to affect cardiovascular fitness. These statistics, however, are based on imprecise measures of exercise involvement (Baranowski, 1988; Washburn & Montoye, 1986).

Self-report assessments have been most commonly used for measuring exercise involvement (Hays & DiMatteo, 1987). Although many attempts have been made to validate self-report instruments (Baranowski, 1989; Bocksnick, 1987; Washburn& Montoye, 1986), instrument validity has remained a major problem (Dishman, 1987). Three major areas of concern have been identified. First, estimations of physical activity involvement, which rely entirely on structured exercise classes, neglect activities which are done outside an organized setting (and these outside activities may contribute immensely to cardiovascular fitness) (Shephard, 1989). Second, self-reports of physical activity involvement are known to be vulnerable to error (Caspersen et al., 1986; LaPorte et al., 1983; LaPorte, Montoye & Caspersen, 1985); for example, a subject's response to the duration of a swim more often reflects the time he/she was near the water rather than the actual time of swimming (Brooks, 1988). Third, older adults who volunteer are better educated, are more active, have better physical and mental health, and belong to a higher socioeconomic strata. Thus, a presumed self-selection bias of volunteers may be even more prominent amongst an older age cohort than amongst a younger age cohort (McPherson, 1983).

Gerontological exercise research also encounters a methodological problem which is directly associated with its population. The older age cohort is known for its immense heterogeneity (Bendall, Bassedy & Pearson, 1989; Brown, 1987; Carter et al., 1989; Ekerdt, Bosse & Levkoff, 1985; Himan et al., 1988; Kellner, 1985; McPherson, 1986;

Molloy, Beerschoten, Borrie, Crillie & Cape, 1988; Nesselroade & Ford, 1985; Thomae & Maddox, 1982), thus group evaluation of treatment differential effects must be considered with extreme caution (Nesselroade & Ford, 1985).

As is the case for the testing of physiological parameters, the assessment of psychological factors related to increased exercise involvement by older adults also encounters methodological problems. The investigation of activity-dependent benefits relies on subjects' self-reports or anecdotal information rather than on the confirmation of empirically stated hypotheses (Myers & Gonda, 1986). This is why Locke(1989) calls for utilizing qualitative research, which "is a systematic, empirical strategy for answering questions about people in a bounded social context. Given any group, role, community, or locus for human interaction, it is a way to define and answer the primordial question 'What's going on here?" (Locke, 1989, p. 2). Despite this methodological dispute, there is no doubt that positive psychological changes may result from regular physical activity involvement.

Another methodological trap is that of testing single variable relationships and assuming that the tests portray "life" situations. This approach has been implemented primarily to satisfy the need for statistical evaluation of behavioral hypotheses; single component treatments do not capture the breadth of a lifestyle issue (Locke, 1989).

> Qualitative research is an inferior strategy for discovering cause and effect relationships, accumulating demographic data, determining how much or how many of anything, or providing the basis for generalizing safely from a sample to a population. On the other hand it is ideal for clarifying situations in which the operative variables are unclear, determining why interventions have unpredicted effects, defining fresh ways to look at overly-familiar problems, understanding how tasks, policies, roles, or other systemic elements are perceived by participants, and for ferreting out of a social setting those subtle influences which may be disguised or displaced in their behavioral representations (Locke, 1989, p. 11).

In using a traditional quantitative approach, Jensen and Bellecci (1987) conducted a comparative study of nonagenarians (age range 90 to 97 years) and younger seniors (age range 65 to 75 years) and demonstrated a cluster of healthy lifestyle habits. Physical activity involvement and appropriate dietary and sleep behavior comprised a healthy lifestyle. Pérusse and colleagues (1987) supported this view of clustering health habits, and they concluded that lifestyle habits of individuals are not isolated from the social environment. Family members commonly share similar lifestyle habits both good and bad, and a familial aggregation of physical inactivity may influence the social support an individual receives. By adopting lifestyle habits of the social environment the individual learns vicariously (Bandura, 1982). Any attempt to modify the behavior must

consequently address the individual within a larger socio-environmental context. Carter et al. (1989), Morgan (1987), and Nesselroade and Ford (1985) believe that multimodal intervention strategies (i.e., the simultaneous implementation of a variety of means such as social support, self-monitoring, and behavior reinforcement) may be superior in optimizing outcomes. But these researchers also raise awareness of problems arising from increasing treatment complexity in the evaluation of the differential effectiveness of individual treatment components.

### 2.4.2 Methodological Concerns in Exercise Adherence Research

Low adherence rates to exercise schedules and inconsistencies in defining adherence have posed problems for the evaluation of actual health benefits from regular exercise (Perkins & Epstein, 1988). In determining the contribution of physical activity to healthy living, the overall physical activity involvement of an individual should be assessed, as opposed to the participation in a fitness class (Perkins & Epstein, 1988). Adherence to physical activity, in light of preventive health care, should be understood as a lifestyle behavior and should not be confused with simple adherence to an exercise class.

The exercise adherence process is complex because it is influenced by situation and person variables in a dynamic process which results in compliant or non-compliant activity behavior (Dishman, 1982). Therefore, the traditional pragmatic approach of studying just one particular variable in relationship to the construct is too simple (Herbert & Teague, 1989). Research methodology must go beyond basic two measures designs, such as how many people attended the program in the beginning versus how many and who attended the program at the end. Herbert and Teague suggest the process of becoming an adherer is one which results from a constant interplay among person, situation, and environment and the differential effect of all these variables on exercise behavior should be investigated. Adherence is not an all-or-none-phenomenon (Dishman, 1982; Oldridge, 1984).

The use of "objective" criteria in assessing adherence is appealing but difficult to do (Levy, 1986). For example, whether adherence to an exercise program must be reflected in perfect attendance and whether non-adherence is reflected in no attendance at all is still debatable. Adherence to a more physically active lifestyle is unquestionably difficult to assess objectively. Even measures such as weight loss, blood pressure, heart rate, attendance frequency, or other fitness variables can be misleading in determining adherence. "The patient may improve or deteriorate for a number of reasons, only one of which may be adherence" (Levy, 1986, p. 193).

Attitudes, self-perceptions, health beliefs, and self-motivation are relevant factors in the adherence process. Statistical evidence that supports this has been limited, however,

partly due to a pragmatic research style which did not consider adherence as a process (Dishman, 1982). "Participation in a physical activity program requires two different considerations. The first adoption may be dependent on the degree of improvement following initial participation, while the second may depend on factors such as spouse approval" (Oldridge, 1982, p. 57). For example, Oldridge found "social" and "to please my wife" to be unimportant reasons for the initiation of an exercise program, but they became significant reasons at a later stage of the program. Knapp (1988) suggested a three-stage approach for the development of habitual exercise behavior. She recognized three distinct phases: (a) the decision to initate exercise, (b) the early acquisition phase, and (c) the long-term maintenance phase. Knapp's three-stage process was supported in King et al.'s (1988) investigation of exercise adoption and exercise maintenance in healthy, middle-aged adults where it was concluded that, based on the subjects' developmental stage of exercise behavior, practitioners should vary the utilization of motivational strategies.

In summary, non-standardized methodology in adherence studies has created problems for analyzing and comparing results (Herbert & Teague, 1989). The primary problem has been that of operationally defining adherence (Dishman, 1982). Attending a fitness program and being physically active are behaviors of different complexity and operational definitions of adherence must vary accordingly. Although this should help explain some of the variability in exercise adherence studies, it is a problem to rationalize average adherence rates of 50% with extreme values of nearly 0% and 100% (Franklin, 1988). Interventions designed to increase exercise adherence have tended to have positive effects with increments of about 10% to 20% above what is expected without any intervention being observed (Martin, 1984; Wankel, 1988a). There is nothing to say, however, that these results may in part reflect a Hawthorne effect.

### 2.4.3 Concerns in Evaluating Counseling Interventions

Counseling research has two inherent problems (Wellman & McCormack, 1984). First, counseling is based on content which is influenced by a person-environment interaction and both elements must simultaneously change in the right direction for a positive change to occur. Second, it is questionable whether genuineness, warmth, and empathy (Egan, 1982; Janis, 1983; Gross, 1988) are quantifiable because across people and across situations, the counselor's task is to adjust accordingly to optimize the success of the counseling (Krumboltz, Becker-Haven &Burnett, 1979). The dynamic and process-oriented adjustment to current situations is a problem area in determining the quantity and quality of counseling-related factors (Krumboltz et al., 1979).

Nagel and colleagues (1988) suggested that behavioral changes could be due to the time the counselor spent with a client which would make an objective evaluation of the efficacy of counseling impossible. Seemingly small behavioral changes, such as in clinical improvements, could also be the result of a variety of things besides counseling. Critical variables such as personal influence of the counselor, within-subject consistency, or inter-subject comparability of counseling settings have been difficult to control experimentally. The effectiveness of a counseling situation has been shown to rely on how the situational and environmental factors are perceived by both the counselor and client (Gross, 1988). To illustrate this, consider the study of Friebel, Sucher, and Lu (1988) who evaluated the effectiveness of nutrition counseling. A successful intervention outcome was quantified through weight loss. Statistically non-significant group changes in weight did not support a positive effect resulting from the counseling, but the intervention did have a significant impact on the dietary behavior of individuals. In interpreting the results, the authors recommended a different methodological approach to evaluate the effectiveness of the program. This was in agreement with Wankel's (1988b) conclusions for a study that utilized a short-term counseling approach to improve adherence to regular exercise involvement by participants of an employee fitness center. Although the results were not statistically significant, the approach was positively evaluated by the participants. On the basis of feedback relevant to the program, Wankel recommended the following revisions to the program: (a) more counselor-client contact because of content complexity (i.e., exercise behavior) and (b) greater flexibility in applying the intervention to individuals.

Short-term counseling has been successful in influencing health behavior despite a limited number of contacts between client and counselor (Janis, 1983). Even one-time counseling sessions have been sufficient to obtain enough motivating power to have an impact on a client's behavior. According to Janis (1983), the key to successful application has been the establishment and subsequent use of motivating power.

Although counseling has been shown to be a viable means for fostering preventive health care action on an individual level, evaluation of the cost-effectiveness of counseling based on statistics for a whole group may not be evident (Friebel et al., 1988). The rationale for using group statistics is based on the desire to generalize the effectiveness of treatments. However, the validity of this approach may be suspect if interventions are individual specific. Locke (1989) argued that valuable information has been misinterpreted and even lost by averaging findings. Quantitative and qualitative information of one individual could be more important and informative than just quantitative information of a whole group (Locke, 1989). There is no generic solution concerning an appropriate

evaluation procedure, but it is important that the solution be determined by the question asked.

## 2.5 Summary

Despite recent trends, physical inactivity continues to be a problem for the older population. There is substantial empirical evidence indicating the detrimental effects of physical inactivity on the physical and cognitive state. The resulting declines appear to be associated with self-chosen and self-defeating lifestyles rather than with age. Recent research in exercise physiology indicates that older adults can exercise safely and can experience various physical gains regardless of age at the time of exercise initiation. Similarly, socio-psychological studies have shown that regularly physically active older adults evidence a greater sense of well-being and life satisfaction.

Positive outcome effects from a physically active lifestyle have been well-documented, yet, less than half of those who initiate such a lifestyle change adhere to it on a long-term basis. Adherence to exercise requires a dynamic process which includes the influence of personal, situational, and environmental conditions. Restrictive health conditions and fewer exercise program opportunities are common constraints to the compliance of members of the older age cohort. In recognizing these constraints, researchers emphasize the importance of providing motivational assistance to older adults to increase their chance of experiencing their potential in late-life.

Various strategies (e.g., self-monitoring, social support, etc.) have been used to determine the most effective means of stimulating exercise adherence. As yet, no particular strategy has proven to be superior. The implementation of multifaceted interventions seems to be the most viable solution. As a result, researchers have recommended the use of complex treatment packages. Their main disadvantage is the quantification of differential contributions of specific treamtent elements while their main advantage is the flexibility of adjusting treatments to the needs of individuals. Short-term counseling is one such complex treatment intervention.

The effectiveness of a counseling intervention is influenced by the counselor's ability to develop motivating power. According to Janis (1983), the probability of a behavior change occurring and lasting is increased when counselors follow a deliberately planned, three-stage approach to acquire, use, and retain motivating power. The ultimate objective of the counseling intervention is to empower individuals to master their own lives by increasing their awareness of their behavioral shortcomings and possible ways of

modifying them. The counseling must, therefore, take place within the context of individual cultural, social, environmental and experiential influences.

A test of the effectiveness of exercise adherence counseling for a cohort of older adults faces three major methodological problems; these are:

1. The older age cohort is known for its immense heterogeneity particularly with respect to physical capabilities.

2. The complexity of decision-making regarding the adherence to exercise is influenced by each individual's situation and person variables.

3. The experimental controllability of a counseling process may be next to impossible because of difficulties in accounting for the personal influence of the counselor, within-subject consistency, and inter-subject comparability of counseling settings.

It appears that a non-traditional and non-pragmatic approach may be most appropriate in determining the effectiveness of short-term counseling as a means of fostering adherence to a more physically active lifestyle by older adults. A methodological approach is recommended that combines both quantitative and qualitative measures in evaluating adherence as a process rather than as a product or result.

# CHAPTER 3 METHODOLOGY

## 3.1 Subjects

The study population was older female adults living in Leduc or Fort Saskatchewan, Alberta. The volunteers were required to be at least 55 years of age, to be relatively inactive prior to the study (according to each subject's self-report), to be free of chronic diseases or conditions which may have been adversely affected by increased involvement in more physically demanding activities, and to have a desire to increase their personal physical activity involvement.

Prospective subjects were contacted through Leduc & District Senior Citizens, Leduc, Alberta, and Pioneer House Club 50, Fort Saskatchewan, Alberta. The study was announced in both organizations through handouts, posters, and the local senior citizens newsletters. Interested subjects attended a public talk in which information pertaining to the benefits from regular exercise involvement and the general requirements of the study was presented. In addition, all individuals were assured of complete confidentiality of the data.

Individuals indicated their willingness to participate by returning a physical activity readiness questionnaire (PAR-Q) and a pre-study questionnaire (see Appendix) in a stamped self-addressed envelope that was provided for them. The PAR-Q served as a screening device for individuals who may have suffered adverse effects with increased physical activity involvement. In addition, subjects were asked to obtain medical approval for exercise if they had not already done so. The pre-study questionnaire served as a screening device to make certain the subjects met the criteria for the study.

Following Atkins, Patterson, Roppe, Kaplan, Sallis and Nader's (1987) advice, the recruitment process did not emphasize complete randomness but rather accepted volunteer participation. Atkins et al. tested the common assumption of volunteers being atypical of the general population, and they found only marginal differences between volunteer participants and nonparticipants. They also suggested that "investigators must be flexible and equipped with a broad variety of strategies for successful recruitment" (p. 93). This is because strategies for recruitment that work at one location, might not work at another.

Twenty-three individuals from Fort Saskatchewan and sixteen from Leduc met the pre-determined study criteria, and entered the study. They completed their first physical activity diary on October 2, 1989. Seven subjects were lost early in the study; four reported deteriorating health conditions which were not triggered by increased exercise, one

moved away, one was involved in a serious car accident, and one stated unmet expectancies as a reason for terminating her involvement.

The average age of the control subjects was about three years older than that of the subjects receiving counseling, 67.27 years (SD = 4.81) and 64.07 years (SD = 5.66), respectively, but these differences were not statistically different ($t = 1.73$, $df = 30$, $p = .094$). The age range was 57 years to 80 ($\underline{M} = 65.87$; SD = 5.36) for the overall sample.

Thirty-two subjects completed all the requirements for the study, eighteen from Fort Saskatchewan and fourteen from Leduc. The data that was available included: (a) a one-week record of physical activity involvement prior to the study (pre-study), (b) the subjects' pre-study perception of their health and physical fitness, intention to increase physical activity involvement, and expectations regarding the effectiveness of the intervention, (c) a one-week record of physical activity involvement for the last week of the study, (d) the subjects' post-study perception of their health and physical fitness, their perception of the effectiveness of the intervention, and their use of intervention-related material and general program evaluation, and (e) records of weekly physical activity involvement during the study, pre-intervention period, intervention period, and post-intervention period. Figure 3.1 displays the phases of the study and the content of the information for both physical activity involvement and the subjects' self-rated information of relevant areas (e.g., health, physical fitness, etc).

## 3.2 Research Design

A pre-test - intervention - post-test quasi-experimental design was employed (Figure 3.2). Subjects were assigned to a counseling intervention group or to a control group, according to their place of residence. This compromised randomization but the advantages of such an approach were:

(a) The contamination effect through study participants from another treatment condition was minimized.

(b) The local presence of the counselor accommodated requests for more flexible counseling appointments.

(c) The counseling schedule of up to four visits a day did not allow the counselor to be in more than one city on a given day.

(d) The task requirements which had to be explained during the introductory talk could focus solely on the present treatment group. In addition, awareness of a comparison to another group might have affected the subjects' attitude towards the treatment.

| DATA SOURCE | pre-study | pre-intervention | intervention | post-intervention | post-study |
|---|---|---|---|---|---|
| (a) physical activity involvement | seven-day recall | diaries | diaries | diaries | seven-day recall |
| (b) self-rated information (e.g., health, etc.) | Likert-type scales | | field notes from counseling * | | Likert-type scales |
| | health | | | | health |
| | fitness | | | | fitness |
| | intention | | | | use of methods |
| | expectancy | | | | program evaluation |

Figure 3.1 Data sources and data content for five consecutive assessment periods.

Note. Pre-study denotes the assessment which took place immediately after the introductory lecture and prior to the beginning of the self-monitoring. Post-study denotes the post-test assessment which took place immediately after each subject had submitted her last physical activity diary. * denotes information collected by the investigator and only available for subjects receiving counseling.

The disadvantage is the loss of control that occurs when assigning subjects to treatment groups because it can bias the results in an unknown way. In other words, the two groups may have differed on variables other than the treatment .

The pre-intervention phase was either two, three, or four weeks, depending on an individual's counseling schedule; the intervention phase was six weeks for all subjects; and the post-intervention phase was either fourteen, fifteen, or sixteen weeks, again depending

| | Subjects receiving counseling | | | | Control subjects | | | Study periods |
|---|---|---|---|---|---|---|---|---|
| Intervention onset | I | II | III | | I | II | III | |
| Recall prior to start of program | pre-study | pre-study | pre-study | | pre-study | pre-study | pre-study | pre-study |
| Week 1 | pre | pre | pre | | pre | pre | pre | |
| Week 2 | pre | pre | pre | | pre | pre | pre | pre- |
| Week 3 | inter | pre | pre | | inter | pre | pre | intervention |
| Week 4 | inter | inter | pre | | inter | inter | pre | |
| Week 5 | inter | inter | inter | | inter | inter | inter | |
| Week 6 | inter | inter | inter | | inter | inter | inter | |
| Week 7 | inter | inter | inter | | inter | inter | inter | |
| Week 8 | inter | inter | inter | | inter | inter | inter | |
| Week 9 | post | inter | inter | | post | inter | inter | intervention |
| Week 10 | post | post | inter | | post | post | inter | |
| Week 11 | post | post | post | | post | post | post | |
| Week 14 | post | post | post | | post | post | post | |
| ..... | ..... | ..... | ..... | | ..... | ..... | ..... | post-intervention |
| Week 24 | post | post | post | | post | post | post | |
| Recall after program termination | post-study | post-study | post-study | | post-study | post-study | post-study | post-study |

Figure 3.2 Phases of data collection, stratified by treatment and onset of treatment.

Note. "pre-study" and "post-study" denote two one-week recall assessments; the first one immediately after the introductory lecture and prior to the self-monitoring, and the second one immdiately after the submission of the last physical activity diary. PRE denotes the period starting with the self-monitoring, October 2, 1989. INTER denotes the intervention period and POST the follow-up period until the termination of the study, March 18, 1990. I, II, and III denote the varying starting dates for subjects receiving counseling and control subjects.

on the counseling schedule (Figure 3.2). Physical activity involvement was monitored by all subjects for a total of 24 weeks, between October 2, 1989 and March, 18, 1990.

### 3.2.1 Treatment: Subjects Receiving Exercise Adherence Counseling

In accordance with Janis' (1983) guidelines for short-term counseling, exercise adherence counseling was implemented by the same counselor (male, 33 years of age) for all experimental subjects. Each subject received six one-hour individual counseling sessions, the purpose of which was to develop individual strategies for adopting and maintaining an increased level of physical activity involvement. The weekly counseling sessions meant there was frequent contact between the counselor and each client, which was planned to foster the development of referent power for the counselor. This was in agreement with Wankel's (1988b) recommendation that more than three counselor-client interaction periods are necessary to allow sufficient time for exploring the complex combination of situational and personal factors influencing one's involvement in physical activity involvement.

The counseling sessions emphasized building up referent power during the first and second visit, using it in visits three and four, and on retaining motivating power and the internalization of adopted decisions during the last two sessions. Specific adherence related topics were discussed, for example: physical activity history and goal-setting (week 1), decision-balance-sheet (week 2), writing of a contract and social support (week 3), self-monitoring and success attribution (week 4), self-reinforcement (week 5), and relapse prevention (week 6). The overall goal was to assist the individual in developing strategies for the adoption and maintenance of an increased level of physical activity involvement. Although the counselor suggested the topics, each subject was given ample time to reflect on her own physical activity involvement (including motivational, situational, and environmental idiosyncracies) of the previous week. Each subject received written summaries of the topics of the counseling sessions (see Appendix F) after their conclusion.

All subjects reported their physical activity involvement by completing diaries on a weekly basis for weeks 1 to 11 and a biweekly basis for weeks 12 to 24. All those activities which were done deliberately for the purpose of improving or maintaining one's level of physical fitness were reported. In addition, the subjects also recorded the duration and the intensity of involvement for each activity.

### 3.2.2 Treatment: Control Subjects

Written information (Appendix F) on the adoption and maintenance of regular, self-initiated exercise was disseminated in six mailings. The information was identical to the

written summaries which were given to subjects receiving counseling after the individual counseling sessions, and they received the written information on the same weekly schedule as the others received counseling. The control subjects also completed and submitted weekly and biweekly diaries on the same schedule as the subjects receiving counseling.

## 3.3 Test Instruments

Three instruments were utilized for the data collection: a pre-study questionnaire, which assessed factual information, the subjects' evaluation of exercise relevant areas like health and physical fitness, and the physical activity involvement for the week prior to the assessment; a post-study questionnaire, which assessed the same information as the pre-study questionnaire; and physical activity diaries, which were compiled seventeen times during the 24-week study period (see Appendices B,C, and D) (Figure 3.1). Field notes were also gathered from the counseling sessions.

### 3.3.1 Pre-study Questionnaire

At the outset of the study volunteers responded to questions which provided the following information about themselves:

1. General demographics such as age and marital status.

2. Perceived health. Since lack of health has been repeatedly found to be the explanation for lower levels of physical activity involvement (Dishman, 1988; Matarazzo, et al., 1984), it was of interest whether or not such an association was also evident for the subjects in this study, prior to the intervention. Perceived health was assessed by two self-rated seven-point Likert-type statements (Clarkson-Smith & Hartley, 1989). The first statement addressed the subjects' absolute quantification of health (*My overall health is ...*), the second addressed health in comparison to that of age peers (*In comparison to others of my age, I think my current health is ....*). Both statements were anchored on "excellent" and "poor".

3. Perceived fitness. Three 7-point Likert-type statements assessed the subjects' perception of their fitness level as it was prior to the study (*My overall level of fitness is...*), as it compared to the fitness level of peers (*In comparison to others my age, I think my level of fitness is ...*), and as it compared to their own of five years ago (*Five years ago, my level of fitness was ...* ). Assessing the subjects' perception of physical fitness at different times in their lives portrayed it as a dynamic, changeable state. The descriptors of

the three Likert-type scales were "excellent" and "poor", "above average" and "below average", and "better than today" and "worse than today", respectively.

4. Exercise involvement. Subjects reported their exercise involvement for two time-periods. First, a seven-day-recall physical activity questionnaire was administered to assess the exercise behavior during the week prior to the assessment day. The subjects were asked to recall the duration of involvement for all those activities which were done for the purpose of improvement and maintenance of physical fitness during the preceding week. Second, two 7-point Likert-type scales were used to assess previous involvement in physical activity and commitment to exercise. The subjects compared their current exercise involvement to their exercise involvement five years ago (*If I compare my physical activity from last week to what I did five years ago, I would say that I am now ...*) by responding to a Likert-type scale anchored on "far more active" and "far less active". They also rated their level of commitment to exercise (*In the last five years my personal commitment to regular physical activity has been ...*) by responding to a Likert-type scale anchored on "excellent" and "poor".

5. Intention to exercise. Intention to exercise was assessed because it has been shown to be an immediate determinant of behavior (Ajzen & Madden, 1986). The subjects' initial commitment to increase their exercise involvement was estimated through two Likert-type scales (e.g., *I would like to be involved in regular physical activities...*). Both statements were anchored on "definitely yes" and "definitely not".

6. Treatment expectations. Three 7-point Likert-type scales depicted the expectations of the subjects with respect to the intervention modalities, counseling (*I think that counseling would help to increase my physical activity level...*), keeping a diary (*I think that keeping a diary about my physical activities would help to increase my physical activity level...* ), and receiving written information (*I think that regularly receiving written information about physical activity and its benefits would help to increase my physical activity level...*).

### 3.3.2 Post-study Questionnaire

The objectives of the post-study questionnaire were to assess the subjects' current physical activity involvement, perception of the effectiveness of intervention means (e.g., lecture, keeping a diary, written information, and counseling), changes in perceived health and physical fitness (i.e., by assessing the perception of the current situation and comparing it to the previous measure), perception of goal attainment, and intention to remain physically active.

All subjects completed a seven-day-recall physical activity questionnaire for the last week of the study as was done in the pre-study questionnaire. Since this time period had also been assessed by using the physical activity diary, a direct comparison of the two measurement methods was possible.

Seven-point Likert-type scales which were anchored on "strongly agree" and "strongly disagree" were used to assess the subjects' evaluation of various aspects of the study. To avoid a contamination effect from specific questions, subjects receiving counseling and control subjects expressed their global perception of the effectiveness of the program before responding to other more detailed questions (*The program was effective in assisting me to increase my physical activity involvement.*).

Subjects from both groups responded to Likert-type statements depicting the subjects' self-evaluation of their goal attainments and their perception of the effectiveness of the methods which were used (e.g., *I accomplished the goals which I had set concerning increasing my regular physical activity involvement.*).

Four Likert-type scales addressed the subjects' perceived health and physical fitness (see pre-study questionnaire). The subjects were also requested to directly compare their current health, physical fitness, and physical activity involvement to that before the study (e.g., *My overall health prior to the start of the program (September, 1989) was ...*). A general program acceptance Likert-type statement (*I would recommend this program to a friend* ) and an open-ended question concluded the post-test questionnaire.

Several questionnaire items were designed to assess specific aspects of short-term counseling and were consequently administered only to subjects receiving counseling. As Janis (1982, 1983) argues that the effectiveness of short-term counseling is dependent upon the establishment and use of motivating (referent) power, questions were framed accordingly.

To identify whether or not the counselor had succeeded in establishing referent power, Janis' indicators of referent power were queried: (a) appropriate levels of self-disclosure (*The counselor asked questions that were too personal.*), (b) positive but selective feedback (*The counselor encouraged and supported my attempts to become physically more active.*), (c) empathy (e.g.,*The counselor genuinely wanted to help me to increase my physical activity involvement.*), (d) assistance in the decision-making process (*I would have liked advice that was more specific on how to increase my physical activity involvement.*), and (e) assistance in developing higher levels of perceived self-efficacy (*Over the past six months (i.e., since the start of the program, September, 1989), I have gained confidence in my ability to be physically active.*) (see Appendix C).

Janis (1983), who primarily reported on weight reduction, suggested a limited number of counseling sessions whereas Wankel (1988b), who had recently used short-term counseling in an employee fitness center, suggested more frequent counseling sessions. To address the perceived appropriateness of the frequency and duration of the intervention in this study two additional questions were asked (e.g., *Was the length of the counseling sessions about right?*). Both questions were anchored on "too short" and "too long".

3.3.3 Physical Activity Diary

Adherence to physical activity involvement was assessed by having subjects complete one-week physical activity diary forms (Appendix D). Each individual completed seventeen diary forms and submitted them to the researcher in stamped self-addressed envelopes, on a weekly basis between October 2, 1989 and December 20, 1989 and on a biweekly basis between January 1, 1990 and March 18, 1990. Subjects reported only those physical activities done for the purpose of maintenance and improvement of physical fitness. They provided information on the duration and intensity of involvement for each activity. Free recall was used for the type and duration of the activity, but subjects were asked to decide between three levels of intensity: (a) light (slight change), (b) medium (some perspiring, above normal breathing), or (c) heavy (heavy perspiration, heavy breathing).

Various researchers have stressed the importance of an appropriate intensity level if certain physiological benefits are to be experienced (Pollock, 1988; Shephard, 1989). Such required levels of exercise intensity vary considerably with the age of the subjects, the previous level of fitness, and the familiarity with a particular exercise. The perception of intensity was considered to be a more appropriate measure than pre-determined MET scores (Borg & Noble, 1977; Fox, Naughton & Gorman, 1972; Parker, Leaff & McAfee, 1988; Washburn & Montoye, 1986) considering the older subject sample.

Using a seven-point Likert-type scale with anchors of "strongly agree (7)" and "strongly disagree (1)", members of both groups responded to the statement "I kept the physcial activity diary as accurately as I could". The means of 6.43 (SD = 0.85) and 6.22 (SD = 1.35) for subjects receiving counseling and control subjects, respectively, did not reflect a statistically significant difference. This suggested that the subjects tried to record their exercise involvement as accurately as possible.

The comparability of the recall and diary modes of physical activity measures was assessed by administering both instruments to all subjects during the last week of the study. A Pearson product-moment correlation coefficient of 0.96 was obtained between

the two measures. This adds confidence to the validity of analyzing the data collected by both the recall method (baseline data prior to the introductory lecture) and the diary method (data collected during the pre-intervention, intervention and post-intervention periods).

3.4 Data Organization

The effectiveness of the short-term counseling treatment was evaluated quantitatively by comparing the change in physical activity involvement of the subjects receiving counseling to that of the control subjects. To do this, the submitted diaries were scrutinized for the following information:

(a) total time spent in physical activities per week,

(b) total number of physical activity entries per week,

(c) total number of different physical activities (e.g., walking, stretching, etc.) per week,

(d) total number of activities per level of intensity per week.

Although the subjects were asked to report only those physical activities that they did deliberately for the improvement or maintenance of their physical fitness, the screening of the diary forms revealed that some subjects had also recorded physical activities such as "raking leaves", "walking the dog", or "shovelling snow". Unquestionably, each one of these activities was physical and provided a physiological stimulus, but so are "shopping" or "vacuuming". Because it was left to the subjects' discretion whether or not an activity was done deliberately for the purpose of physical fitness, all but activities of daily living (ADL) were included in the evaluation process. Inclusion of "non-normative" fitness or physical activity behaviors such as "shovelling snow" may be justified best by a subject's comment next to her entry "raking leaves" - *Last year I would have hired somebody.* These "non-normative" physical activity behaviors were commonly instrumental and of considerable duration. Although recordings of two hours and longer were not uncommon, it was decided to give credit to a maximum of only 60 minutes per entry.

Repeatedly researchers have noted marked inter-subject variability amongst members of the older population, regardless of the content under scrutiny (Chappell, Strain & Blandford, 1987; McPherson, 1986; Kellner, 1985). Due to these fluctuations, extreme caution must be exercised when utilizing raw data for evaluative purposes and in applying inferential statistics, and in making group comparisons. Kerlinger (1973) suggests it may be necessary to categorize interval-scaled data and subject it to non-parametric rather than parametric statistics. A loss of information due to a down-scaling of the data, from interval-scaled to ordinal-scaled or nominal-scaled, may be less harmful than violating

statistical assumptions such as sample homogeneity. This caution was accommodated in the current study by utilizing a combination of parametric and non-parametric statistics as well as subjective qualitative approaches to analyze the obtained information.

3.5 Analytic Strategy

The statistical strategies which were employed varied in accordance to the data and the research hypothesis. Basically, there were two sources of quantitative data: (a) physical activity involvement, which was based either on a seven-day recall assessment or on weekly diaries; and (b) self-ratings concerning one's health and fitness and reaction to the program-related aspects, which were collected from Likert-type scales. These two sources of quantitative data were assessed for both the subjects receiving counseling and the control subjects. Furthermore, some information (e.g., Likert-type information on perceived health and physical fitness, physical activity behavior) was assessed several times, whereas other information (e.g., perception of the efficacy of the intervention means) was gathered only once. The following statistical procedures were employed to analyze the quantitative information:

1. Independent t-test analyses were utilized to investigate statistical differences between the two groups of subjects since there were only two treatment conditions. The analyses were conducted for both measures of physical activity involvement (i.e., seven-day recall and diary assessment) and also to test for differences regarding the subjects' evaluation of exercise relevant areas (e.g., health, physical fitness, etc.) if applicable for both pre-test and post-test, separately.

2. A repeated measures analysis of variance was utilized to determine a time-related treatment effect on the outcome measure of physical activity involvement. Physical activity involvement was the dependent variable, time (i.e., pre-intervention, intervention, and post-intervention period) and treatment (i.e., counseling condition versus control condition) were the independent variables. A repeated measures analysis of variance seemed appropriate as there were three consecutive estimates of physical activity involvement using the same assessment tool.

3. Dependent t-test analyses were employed to investigate within-subject changes for the subjects' evaluation of exercise relevant areas (e.g., health, physical fitness, etc.).

4. The chi-square test of homogeneity for two independent samples was employed to compare the subjects of both groups with respect to the proportion of those that were successful / unsuccessful in changing their exercise behavior (Woolson, 1987). In this study, the objective for the subjects was to increase their physical activity involvement.

Thus, an increase in exercise behavior was equated with a successful behavior change, whereas a decrease or maintenance was an unsuccessful behavior change.

5. Pearson product-moment correlation coefficients were calculated to assess the associations among the subjects' evaluations of exercise relevant areas (e.g., health, physical fitness, etc.) and physical activity involvement. The correlation coefficient computations were repeated for the change in exercise behavior expressed as a percentage change score, since the main objective of the intervention was a behavior change and not the actual physical activity involvement.

The exercise involvement pattern for each subject was evaluated separately. Descriptive quantitative information about the weekly physical activity involvement was considered simultaneously with qualitative information obtained in the counseling sessions. Field notes and self-referent comments from the subjects provided the basis for a qualitative analysis of the behavior pattern. This information helped to explain events which had influenced the subjects' exercise involvement.

To account for extraneous variables such as weather or seasonal conditions, all participants submitted data for the same weeks, but treatments were introduced at different times according to design so extraneous effects would appear at different stages for treatment subjecst. The differential impact on the exercise involvement stemming from such individual events as vacation, acute illness, or serious family matters also had to be considered. This was accomplished through descriptive individual case analyses. These individual analyses also allowed a more in-depth evaluation of the differential effectiveness of topics of the counseling program (e.g., goal-setting, self-monitoring, self-reinforcement, etc.).

# CHAPTER 4 RESULTS AND DISCUSSION

## 4.1 Quantitative Analyses

### 4.1.1 Comparison of Pre-study Data

The two samples, subjects receiving counseling and control subjects, were compared prior to the study by performing a series of independent t-tests on self-reported physical activity involvement and self-ratings of perceived health, physical fitness, and exercise history. The means for physical activity involvement were statistically non-significant at a 0.05 level of probability (Table 4.1 and Figure 4.1). Large standard deviations of 274.29 for subjects receiving counseling and 169.87 for control subjects accounted for the non-significant difference in the average involvement in physical activities (which was 225 minutes per week and 254 minutes per week for the two groups, respectively). These standard deviations indicated extremely large within-group variations for both groups. This finding reflects previous observations by Carter et al. (1989) and Ekerdt et al. (1985) who reported extreme heterogeneity among members of this age cohort. It seems likely, therefore, that alternate designs like multiple baseline approaches (Nesselroade & Ford, 1985) or qualitative case study approaches (Locke, 1989) may be more suitable when studying the older population.

Perceived health was assessed with two items, one targeted "overall health" and the other targeted "health in comparison to age peers". Physical fitness was investigated by three questions focusing on "overall fitness", "fitness in comparison to others", and "level of fitness, five years prior". Exercise history was assessed with an additional question, which had subjects compare their present "level of physical activity involvement to that of five years prior", on a scale that was anchored on "far more active " and "far less active"[2].

Independent t-tests comparing the means of the members of the two groups indicated that the control subjects consistently perceived themselves as being healthier and more physically fit than did the subjects in the counseling condition (Table 4.2). Although members of both groups perceived themselves as being of better health "in comparison to age peers", control subjects again reported a more positive health perception than subjects receiving counseling.

With respect to "perceived level of physical fitness", the control subjects again scored significantly higher than the subjects receiving counseling (Table 4.2). In comparing their level of physical fitness to that of peers, both groups reported being above

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[2] The raw data of several Likert-type scales has been converted so that for all assessments of that kind high values reflect positive responses.

average[3], but again the control group scored significantly higher. No statistically significant difference at a predetermined alpha-level of 0.05 was obtained for exercise history; both groups perceived that their level of physical fitness was better five years ago than today and reported being less physically active today.

Table 4.1

Comparison of Physical Activity Involvement for Subjects Receiving Counseling (CSLG) and Control Subjects (CTRL), for Four Assessments

| Phase | Group | Mean | SD | Group | Mean | SD | t-value | Prob. |
|---|---|---|---|---|---|---|---|---|
| pre-study | CSLG | 225.35 | 274.29 | CTRL | 254.72 | 169.87 | 0.35 | 0.72 |
| pre-intervention | CSLG | 271.15 | 142.97 | CTRL | 373.45 | 208.98 | 1.64 | 0.11 |
| intervention | CSLG | 260.71 | 128.09 | CTRL | 373.03 | 221.72 | 1.79 | 0.08 |
| post-intervention | CSLG | 272.64 | 134.18 | CTRL | 368.02 | 231.28 | 1.46 | 0.15 |

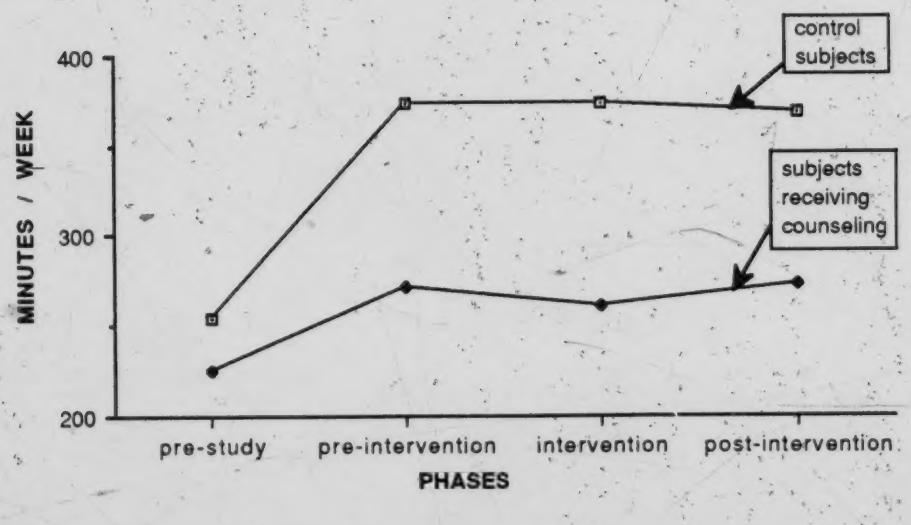


Figure 4.1 Comparison of average reported physical activity involvement of control and counseling subjects, for four assessment periods.

[3]Average on a 7-point Likert-type scale is 4.

Table 4.2

Pre-program Comparison of Subjects Receiving Counseling (CSLG) and Control Subjects (CTRL) for Perceived Health, Perceived Physical Fitness, and Activity Involvement from Five Years Ago

| SOURCE | GROUP | MEAN | SD | GROUP | MEAN | SD | t-value | Prob. |
|---|---|---|---|---|---|---|---|---|
| overall health | CSLG | 4.29 | 0.91 | CTRL | 5.00 | 0.84 | 2.30 | 0.03 |
| health compared to others | CSLG | 4.21 | 0.98 | CTRL | 5.17 | 0.86 | 2.94 | 0.01 |
| overall fitness | CSLG | 3.57 | 1.02 | CTRL | 4.28 | 0.67 | 2.37 | 0.03 |
| fitness compared to others | CSLG | 4.08 | 1.04 | CTRL | 4.83 | 0.92 | 2.14 | 0.04 |
| fitness, 5 years ago | CSLG | 5.00 | 1.24 | CTRL | 5.06 | 1.26 | 0.13 | 0.90 |
| active, 5 years ago | CSLG | 3.43 | 1.09 | CTRL | 3.61 | 1.04 | 0.48 | 0.63 |

It was not surprising to find older adults in this study who perceived themselves as relatively healthy. This agrees with McPherson's (1983) observation that a self-selection bias among volunteering older adults exists — they are generally healthier, more physically fit, and more knowledgeable about health issues. Interesting, however, is the difference between members of the two groups with respect to self-rated health and physical fitness. According to Lohr et al. (1988), less exercise involvement among members of the counseling group should be of no surprise considering their lower self-rated health. Health represents not just a reason for initiating exercise but also for refraining from exercise (Deobil, 1989). The significant difference on the health variable must be kept in mind when interpreting any further results.

4.1.2 Comparison of Data during the Pre-intervention, Intervention, and Post-intervention Periods

Physical activity involvement during intervention periods. It was hypothesized that following the pre-intervention period, the physical activity involvement of subjects receiving counseling would increase more than that of control subjects, and that it would remain greater for subjects receiving counseling from this time onward. Furthermore, both subjects receiving counseling and control subjects would show a decrease in their physical activity involvement during the post-intervention period as compared to the intervention period. However, subjects receiving counseling were expected to show a smaller decrease and both groups were expected to maintain a higher level of physical activity involvement during the post-intervention period than they exhibited in the initial assessment prior to any intervention.

The relative within-group stability of the recorded behavior for the three assessment periods following the initial seven-day recall measure (pre-study) is displayed in Figure 4.1 (page 53). The representation of the mean values may be deceiving as the error bars for the individual measures are excluded. However, it must be noted that the standard deviations overlapped considerably (Table 4.1, page 53). Although the group means for the two treatment conditions were markedly different across the three final assessments, it is important to note that, as in the case of the initial assessment, the standard deviations for each mean were extremely large.

Figure 4.2 (page 56) depicts average weekly variations for members of both groups. Of interest is the relatively similar pattern of high and low levels of physical activity involvement for both groups. The first peak coincided with the time immediately following the introductory lecture and the beginning of the self-monitoring. Relatively low levels were evident in both groups for week 11 and week 14 which corresponded to the pre- and post-Christmas season. Other low recordings related strongly with environmental conditions in which a variety of factors (e.g., icy road conditions, temperature, snow, wind) combined to make outdoor activities hazardous. The importance of these environmental influences, as well as personal circumstances, will be discussed in the case study reports.

Following the statistically non-significant finding for the first seven-day recall, a 2 x 3 (Intervention x Time) repeated measures analysis of variance (ANOVA) was employed to determine a possible intervention effect on the subjects' physical activity involvement. The analysis tested for significant differences due to an intervention effect (a between-subjects factor), a time effect (a within-subjects repeated measures factor), and a

time x intervention interaction effect based on three consecutive measures utilizing the same assessment procedure. The calculations revealed no statistically significant differences in any case (Table 4.3).

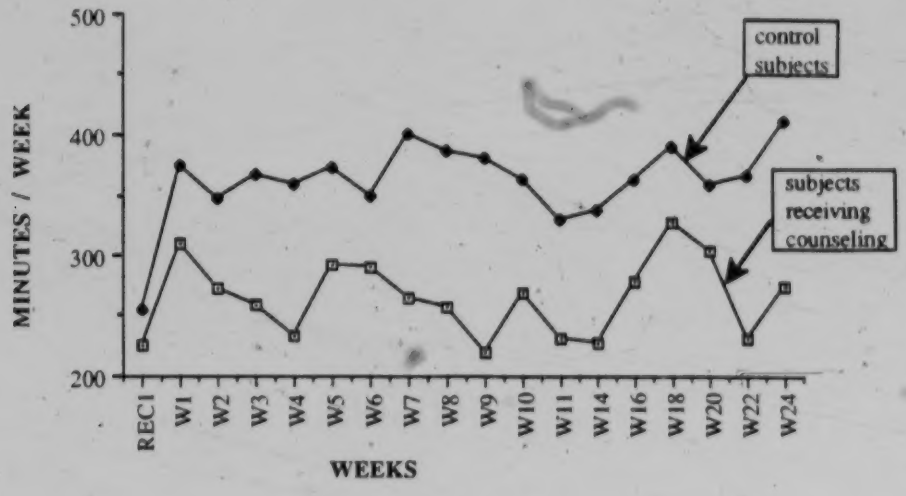


Figure 4.2 Comparison of 24 weekly reported physical activity involvement scores for counseling and control subjects.

Note. REC denotes the seven-day recall assessment taken immediately after the introductory lecture. W1 to W24 denote individual weeks of data assessment.

Table 4.3

Repeated Measures Analysis of Variance (ANOVA) for Three and Four Consecutive Measures of Physical Activity Involvement for Subjects Receiving Counseling and Control Subjects

| | 2 x 3 (intervention x time) repeated measures ANOVA | | | 2 x 4 (intervention x time) repeated measures ANOVA | | |
|---|---|---|---|---|---|---|
| | df | F-value | p-value | df | F-value | p-value |
| intervention | 1 | 2.68 | 0.11 | 1 | 2.19 | 0.15 |
| time | 2 | 0.03 | 0.97 | 3 | 3.29 | 0.02 |
| intervention X time interaction | 2 | 0.09 | 0.91 | 3 | 0.64 | 0.59 |

Based on the compatability of both physical activity measures (see Methodology), it was deemed justifiable to subject the activity information for the four consecutive assessments (a seven-day recall measure prior to the study and the physical activity diaries during the study) to a 2 x 4 repeated measures ANOVA. A statistically significant time effect was calculated ($F = 3.29$, $df = 3$, $p = 0.02$) (Table 4.3). Both the intervention main effect and the time x intervention interaction effect were again statistically non-significant. The examination of the means indicated that although both groups improved their involvement during the three final measures in contrast to their baseline measures, there was tremendous individual variability (see also Table 4.1, page 53).

The increase in physical activity involvement occurred when subjects started self-monitoring their exercise behavior. Although self-monitoring is commonly used for assessing home-based exercise behavior, several researchers (Bélisle et al., 1987; Juneau et al., 1987; King et al., 1988; Kriska et al., 1986; Noland, 1989) have commented on the effectiveness of self-monitoring as an adherence-increasing strategy. Questionable is the long-term adherence to a more physically active lifestyle once the task of keeping a diary is terminated. Without any doubt the quantitative data suggested a significant effect coinciding with the group presentation and the onset of the self-monitoring. However, the hypothesis regarding a difference in the magnitude of physical activity involvement between groups on the basis of the intervention had to be rejected.

Given the observations of both the large individual variability among subjects and a similar physical activity trend of groups over the four assessment periods, it was considered more appropriate to treat the data in an exploratory manner. The participation data was categorized into binomial data for a non-parametric statistical analysis and the individual cases were examined in a qualitative manner to analyze influences on participation across time.

Each individual's physical activity information was categorized binomially according to whether or not the exercise involvement had increased during the intervention period and the post-intervention period as compared to the previous phase. The non-parametric information was then subjected to the chi-square test of homogeneity for two independent samples (Woolson, 1987)[4].

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[4]Although Fisher's exact test is generally recommended for comparing two independent samples of binomially distributed data, the utilization of this procedure relies on small samples. When a sample exceeds five counts per cell, as was the case in this study, the chi-square test of homogeneity for two independent samples may be used in its place (Woolson, 1987).

Six of 14 subjects receiving counseling and 8 of 18 control subjects increased their physical activity involvement from pre-intervention to intervention period (Table 4.4). The chi-square statistic was statistically non-significant indicating that the behavior of the subjects did not reflect the hypothesized treatment effect of a greater increase in exercise behavior for subjects receiving the counseling intervention.

For both groups, the results indicated that a majority of subjects achieved their behavioral intention of increasing their physical activity from the intervention to the post-intervention period (Table 4.4). Again, the difference between the groups was not statistically significant as similar proportions of both groups were successful.

Consistent with the parametric analysis, the non-parametric analysis indicated that the greatest participation change occurred immediately after the introductory lecture and with the beginning of the self-monitoring (Table 4.1, page 53, and Figure 4.2, page 56). There was no statistical evidence of a difference between groups from the pre-study to the pre-intervention assessment (Table 4.4). The hypothesis of a difference between groups on the basis of the intervention was therefore rejected.

These results should be considered with caution, however, because (a) the sample size was small, (b) self-rated health differed statistically among members of both groups, and (c) immense within-group variability was apparent.

The tremendous dispersion of physical activity involvement for members in both groups triggered interest in the frequency distribution regarding their amount of involvement at different times. Possible shifts towards a more physically active involvement were scrutinized through frequency distribution tables on a group level and qualitative case analyses on an individual level.

The distribution of the exercise involvement of the subjects in both groups was summarized in categories which represented multiples of one hour. A maximum level was set, however, so that all subjects reporting more than 420 minutes of activity per week were collapsed into one group. The results were summarized in terms of the number of subjects per category and group percentage scores to enable a direct comparison despite the unequal size of the groups (Table 4.5 and Table 4.6).

The data indicated that amongst subjects receiving counseling, the number of physically inactive subjects (arbitrarily defined as less than 120 minutes per week) decreased immediately after the introductory lecture and with the beginning of the self-monitoring. The percentage of subjects at various levels of involvement at the four assessments varied between 7.14% and 28.57%, with nobody participating less than 60 minutes during post-intervention (Table 4.5 and Table 4.6). Overall, the data suggested an early adoption of greater physical activity involvement and a subsequent maintenance of

this level of involvement. On the other side, the information for the control subjects revealed a more bipolar distribution during the follow-up assessment. Here, a group of relatively low-active individuals existed next to a group of very-active individuals (e.g., more than 50% of the subjects belonged to the categories of 360 minutes per week and more).

Table 4.4

Chi-square Analysis of Proportions of Counseling and Control Subjects who Increased Their Physical Activity Involvement During the Four Assessment Periods.

| | | Subjects receiving counseling | Control subjects | Chi-square | Probability |
|---|---|---|---|---|---|
| pre-study to pre-intervention | successful | 10 | 13 | | |
| | unsuccessful | 4 | 5 | | |
| I II | % increased | 71.42 % | 72.22 % | 0.002 | 0.954 |
| pre-intervention to intervention | successful | 6 | 8 | | |
| | unsuccessful | 8 | 10 | | |
| II III | % increased | 42.85 % | 44.44 % | 0.008 | 0.928 |
| intervention to post-intervention | successful | 8 | 9 | | |
| | unsuccessful | 6 | 9 | | |
| III IV | % increased | 57.14 % | 50.00 % | 0.161 | 0.688 |

Group comparison of intensity, frequency, and variety of physical activity involvement during intervention periods. It was hypothesized that subjects receiving counseling would show a greater involvement in more physically demanding activities than would control subjects, following the intervention. In addition, it was also predicted that the number of exercise bouts (i. e., the weekly number of valid entries in a diary) and the number of different activities (e. g., walking, dancing, aquasize) would display a similar

pattern of increase. No statistically significant differences between the two groups resulted in a rejection of the hypothesis. The results, however, revealed that control subjects did consistently report greater involvement in low-intensity activities than did the subjects receiving counseling while the opposite was the case for moderate-intensity activities (Table 4.7). For both groups, both low-intensity activities (ranging from 2.98 activities per week to 4.63 activities per week) and moderate-intensity activities (ranging from 3.49 activities per week to 4.90 activities per week) were reported far more frequently than high-intensity activities (ranging from 0.23 activities per week to 0.90 activities per week). The consistently large variability in each of the measures for both groups, together with the relatively small sample sizes, precluded the occurrence of any statistically significant differences.

Table 4.5

Frequency Distribution of Physical Activity Involvement during Four Assessment Periods for Subjects Receiving Counseling

| MINUTES | pre-study | pre-intervention | intervention | post-intervention |
|---|---|---|---|---|
| 0 - 60 | 14.29% (2) | - | - | - |
| 60 - 120 | 28.57% (4) | 14.29% (2) | 7.14% (1) | 14.29% (2) |
| 120 - 180 | 14.29% (2) | 14.29% (2) | 21.43% (3) | 7.14% (1) |
| 180 - 240 | 21.43% (3) | 21.43% (3) | 28.57% (4) | 28.57% (4) |
| 240 - 300 | 7.14% (1) | 7.14% (1) | 14.29% (2) | 7.14% (1) |
| 300 - 360 | - | 21.43% (3) | 14.29% (2) | 21.43% (3) |
| 360 - 420 | - | 7.14% (1) | - | 7.14% (1) |
| 420 and more | 14.29% (2) | 14.29% (2) | 14.29% (2) | 14.29% (2) |

The preference for activities of lower intensity is consistent with findings from previous studies (Kriska et al., 1986; Pollock et al., 1989; Walker et al., 1988). Given the choice, older adults do not engage in strenuous activities (McPherson, 1986). Exercising at 80% of cardiovascular capacity may not be necessary, however, as regular exercise involvement at lower intensity did not prevent the attainment of cardiovascular benefits in the study by King and associates (1988).

The mean of the total number of valid entries ranged from 7.40 activities per week to 9.40 activities per week for subjects receiving counseling and from 8.83 activities per

week to 9.55 activities per week for control subjects (Table 4.7). More interesting than the relative similarity of the mean values was the difference in the standard deviations, which ranged from 3.06 to 3.62 for subjects receiving counseling and from 5.40 to 6.37 for control subjects. The subjects receiving counseling were more evenly distributed in the number of activities they were involved in than control subjects who had a cluster of "high" and "moderately low" exercisers (see also Table 4.5 and Table 4.6).

Table 4.6

Frequency Distribution of Physical Activity Involvement during Four Assessment Periods for Control Subjects

| MINUTES | pre-study | pre-intervention | intervention | post-intervention |
|---|---|---|---|---|
| 0 - 60 | 11.11% (2) | - | 5.56% (1) | 5.56% (1) |
| 60 - 120 | - | 5.56% (1) | 5.56% (1) | 11.11% (2) |
| 120 - 180 | 16.67% (3) | 16.67% (3) | 5.56% (1) | 11.11% (2) |
| 180 - 240 | 33.33% (6) | 5.56% (1) | 5.56% (1) | - |
| 240 - 300 | 5.56% (1) | - | 22.22% (4) | 11.11% (2) |
| 300 - 360 | 11.11% (2) | 27.78% (5) | 5.56% (1) | 5.56% (1) |
| 360 - 420 | 5.56% (1) | 16.67% (3) | 11.11% (2) | 16.67% (3) |
| 420 and more | 16.67% (3) | 27.78% (5) | 38.38% (7) | 38.38% (7) |

The average values for the number of different activities (e.g., a diary record of bowling, aquasize, and walking represented three different activities, even if reported more than just once) were almost identical for both groups (Table 4.8). The range for the number of different activities across the three time periods (pre-intervention, intervention, and post-intervention) was 2.09 to 2.74 for subjects receiving counseling and 2.46 to 2.28 for control subjects (Table 4.9).

### 4.1.3 Self-evaluation of Intervention Strategies

Following the termination of the program, all subjects self-evaluated their goal accomplishments. They also provided their assessments of how much the intervention strategies had assisted them in attaining their goals and to what degree they had used the intervention information to reach their personal goals. The information was retrieved from

7-point Likert-type scales, which were anchored by either "strongly agree" and "strongly disagree" or by "not at all" and "a great deal".

Table 4.7

Comparison of Frequency of Physical Activity Involvement, for Three Levels of Intensity, for Subjects Receiving Counseling and Control Subjects, for Three Assessment Periods

| SOURCE | MEAN (counseling) | SD | MEAN (control) | SD | t-value | Prob. |
|---|---|---|---|---|---|---|
| "Low" pre-intervention | 3.48 | 2.12 | 4.63 | 4.91 | 0.90 | 0.38 |
| "Low" intervention | 3.94 | 2.25 | 4.60 | 6.40 | 0.41 | 0.69 |
| "Low" post-intervention | 2.98 | 2.67 | 4.43 | 5.98 | 0.91 | 0.37 |
| "Moderate" pre-intervention | 3.70 | 3.13 | 3.49 | 2.77 | 0.19 | 0.85 |
| "Moderate" intervention | 4.90 | 3.17 | 4.05 | 3.38 | 0.74 | 0.47 |
| "Moderate" post-intervention | 4.54 | 3.32 | 4.02 | 3.57 | 0.42 | 0.68 |
| "High" pre-intervention | 0.23 | 0.34 | 0.71 | 1.12 | 1.72 | 0.10 |
| "High" intervention | 0.56 | 0.68 | 0.90 | 1.31 | 0.96 | 0.34 |
| "High" post-intervention | 0.42 | 0.62 | 0.82 | 1.41 | 1.08 | 0.29 |

In comparing the responses given by members of the two groups, similar trends were evident (Table 4.10). Despite the generally positive evaluation from all participants, statistically significant group differences were evident. Subjects who were exposed to the counseling treatment reported receiving significantly more assistance from the program in increasing their physical activity involvement than did control subjects. Subjects receiving counseling also indicated a significantly greater increase in confidence in their ability to be physically active and reported having made significantly more use of the information from the introductory lecture and from the pamphlets. Although the other variables did not reach a level of statistical significance, subjects receiving counseling consistently evaluated the program more positively than did the control subjects. These findings are in general agreement with other studies (Bélisle et al.,1987; Daltroy, 1985; King et al., 1988; Kriska et al., 1986; Weber & Wertheim, 1989) which emphasized personal contact[5]. Personal contact appears to have a positive effect on increasing awareness and attitudes towards behavior changes.

Table 4.8 Comparison of Frequency of Total Physical Activity Bouts, for Subjects Receiving Counseling and Control Subjects, for Three Assessment Periods

| SOURCE | MEAN (counseling) | SD | MEAN (control) | SD | t-value | Prob. |
|---|---|---|---|---|---|---|
| Total entries pre-intervention | 7.40 | 3.62 | 8.83 | 5.38 | 0.90 | 0.38 |
| Total entries intervention | 9.40 | 3.07 | 9.55 | 6.06 | 0.09 | 0.92 |
| Total entries post-intervention | 7.94 | 3.06 | 9.27 | 6.37 | 0.78 | 0.44 |

It was hypothesized that there would be a high positive association between perceived goal achievement and utilization of the counseling materials and the subjects' physical activity involvement after the study. The simultaneous occurrence of both minimal variation (i.e., the standard deviations ranged from 0.51 to 1.28) among all subjects for the different belief measures (Table 4.10) and immense variation among all subjects for the

[5]In these studies personal contact was established by phone.

physical activity involvement (Table 4.1, page 53) contributed to unexpected Pearson product-moment correlation coefficients (Table 4.11). Although a number of correlation coefficients reached statistical significance, their meaningfulness is questionable. The correlation coefficients are not only in opposition to the predicted trend, but they also contradict the subjects' perception of the effectiveness of the intervention which was positive, particularly for subjects receiving counseling. Thus, the correlation coefficients must be considered spurious. Association scores were also calculated for the percentage improvement of physical activity involvement during the follow-up period. The correlation coefficients again were relatively small, never exceeding 0.5, and they also reflected a negative association for the subjects in the counseling treatment group who perceived the intervention as most effective. In conclusion, the hypothesis of a positive association between the rating of goal attainment and the exercise behavior of the subjects had to be rejected. However, the findings were interpreted as not being indicative of the relationship between perceived efficacy of the treatment intervention and the subjects' behavior change.

Table 4.9
Comparison of Frequency of Different Activities Engaged in by Counseling and Control Subjects, for Three Assessment Periods

| SOURCE | MEAN (counseling) | SD | MEAN (control) | SD | t-value | Prob. |
|---|---|---|---|---|---|---|
| Activities pre-intervention | 2.09 | 1.00 | 2.46 | 0.96 | 1.07 | 0.30 |
| Activities intervention | 2.74 | 0.73 | 2.32 | 0.83 | 1.52 | 0.14 |
| Activities post-intervention | 2.46 | 0.94 | 2.28 | 0.80 | 0.59 | 0.56 |

4.1.4 Self-evaluation of Perceived Health and Physical Fitness

To investigate the subjects' perception of health and fitness following the termination of the program and to detect possible changes occurring during the program, health- and fitness-related questions were readministered after the program.

Table 4.10

Comparison of Self-evaluation for Goal Accomplishment, Perceived Confidence, Perceived Efficacy of Intervention Strategies, and Personal Utilization of Intervention Means, for Both Groups

| SOURCE | MEAN (CSLG) | SD | MEAN (CTRL) | SD | t-value | Prob. |
|---|---|---|---|---|---|---|
| Assisted to reach goal | 5.93 | 1.00 | 5.17 | 1.10 | 2.03 | 0.05 |
| Increased confidence | 6.00 | 0.78 | 5.11 | 1.13 | 2.50 | 0.02 |
| Accomplished goal | 5.64 | 1.08 | 5.00 | 1.19 | 1.58 | 0.13 |
| Intention to remain active | 6.21 | 0.89 | 5.94 | 0.87 | 0.86 | 0.40 |
| Lecture helped | 5.23 | 1.09 | 5.22 | 0.65 | 0.03 | 0.98 |
| Diary helped | 5.92 | 1.12 | 5.33 | 1.24 | 1.37 | 0.18 |
| Pamphlet helped | 5.77 | 1.17 | 5.11 | 0.90 | 1.78 | 0.09 |
| Counseling helped | 6.61 | 0.51 | x | x | x | x |
| Used lecture information | 5.77 | 0.93 | 4.11 | 1.50 | 3.54 | 0 |
| Used pamphlet information | 5.15 | 1.28 | 4.17 | 1.20 | 2.20 | 0.04 |
| Used counseling information | 6.07 | 1.14 | x | x | x | x |

Note. CSLG and CTRL describe subjects receiving counseling and control subjects, respectively.

Control subjects again reported that they were significantly healthier than did subjects receiving counseling (Table 4.12). None of the other comparisons reached statistical significance as both groups rated themselves as being considerably healthier and more physically fit than their age counterparts and to be more physically active after the program than prior to the start of the program.

In the post-program questionnaire, two questions assessed the subjects' beliefs about their overall health and level of physical fitness prior to the start of the study. In both cases, group averages differed significantly (Table 4.13). Overall health prior to the program was perceived as being about average for subjects receiving counseling (4.21) and above average for the control subjects (5.33).

Moreover, these group averages were quite comparable to the values which were obtained in the first assessment, prior to the program (4.29 and 5.00 respectively for

subjects receiving counseling and control subjects, Table 4.2, page 54). Similar results were also evident for the assessment of the level of physical fitness.

Table 4.11

Pearson Product-moment Correlation Coefficients for Measures of Perceived Goal Achievement and Use of Intervention Aides with Actual Physical Activity Involvement (Post-study) and with Behavioral Percentage Change of Physical Activity Involvement, for Both Groups

| SOURCE | post-study (CSLG) | %change, post-intervention (CSLG) | post-study (CTRL) | %change, post-intervention (CTRL) |
|---|---|---|---|---|
| Assisted to reach goal | -0.30 | -0.20 | 0.06 | 0.22 |
| Increased confidence | -0.33 | -0.20 | 0.17 | 0.43 |
| Accomplished goal | -0.20 | 0.17 | 0.31 | 0.28 |
| Intention to remain active | -0.26 | -0.50 * | 0.41 | 0.46 * |
| Lecture helped | 0.62 | -0.39 | -0.23 | -0.01 |
| Diary helped | -0.36 | -0.32 | -0.02 | 0.16 |
| Pamphlet helped | -0.78 ** | -0.15 | 0.26 | 0.14 |
| Counseling helped | -0.61 * | -0.27 | - | - |
| Used lecture information | -0.37 | -0.10 | 0.20 | 0.20 |
| Used pamphlet information | -0.04 | -0.15 | 0.21 | -0.32 |
| Used counseling information | -0.02 | 0.21 | - | - |

Note. * denotes alpha level of 0.05; ** denotes alpha level of 0.01. CSLG and CTRL describe subjects receiving counseling and control subjects, respectively.

Dependent t-tests were used to investigate changes in perceived health and level of physical fitness during the program. The comparisons revealed that members of both groups consistently reported more positively in the post-program assessment when compared to the pre-program assessment (Table 4.14). Both subjects receiving counseling and control subjects rated their health significantly better overall at the post-program assessment. In contrast, only subjects receiving counseling indicated significant improvement in their health when compared to their age peers. The t-value (1.83) for the

control subjects only approached significance ($p = 0.09$). Similar results were computed for both measures relating to physical fitness. Consistently, the subjects perceived themselves as more physically fit after the program than prior to the program. Statistical significance, however, was not reached when control subjects compared their level of fitness to that of age peers. Subjects receiving counseling rated themselves significantly more fit when compared to both their pre-study level and in relation to their age peers.

Table 4.12

Post-program Comparison of Subjects Receiving Counseling (CSLG) and Control Subjects (CTRL), for Perceived Health, Perceived Physical Fitness, and Activity Involvement Prior to the Program

| SOURCE | Group | Mean | SD | Group | Mean | SD | t-value | Prob. |
|---|---|---|---|---|---|---|---|---|
| overall health | CSLG | 4.93 | 0.73 | CTRL | 5.56 | 0.86 | 2.19 | 0.04 |
| health compared to others | CSLG | 5.21 | 1.12 | CTRL | 5.78 | 1.00 | 1.50 | 0.15 |
| overall fitness | CSLG | 4.43 | 0.76 | CTRL | 4.94 | 1.31 | 1.32 | 0.20 |
| fitness compared to others | CSLG | 5.00 | 0.96 | CTRL | 5.22 | 1.11 | 0.59 | 0.56 |
| active, last week | CSLG | 5.50 | 1.02 | CTRL | 5.06 | 0.80 | 1.38 | 0.18 |

Table 4.13

Comparison of Retrospective Evaluation of Health and Physical Fitness for Subjects Receiving Counseling (CSLG) and Control Subjects (CTRL)

| SOURCE | Group | Mean | SD | Group | Mean | SD | t-value | prob |
|---|---|---|---|---|---|---|---|---|
| health prior to program | CSLG | 4.21 | 1.12 | CTRL | 5.33 | 1.03 | 2.93 | 0.01 |
| fitness prior to program | CSLG | 3.29 | 0.99 | CTRL | 4.39 | 1.46 | 2.42 | 0.02 |

The subjects' perceptions are in line with what was reported in previous gerontological exercise research (Blumenthal et al., 1989; Haskell, 1987; Shephard et al., 1986). Regular physical activity involvement, at a level higher than what it was prior to the study, resulted in benefits which are equated with improvements in self-rated health and -

physical fitness. Although the source of information lacks objectivity (Locke, 1989), using subjects as their own comparison contributes to the validity of the information (Nesselroade & Ford, 1985).

Table 4.14

Within-subject Comparison for Subjects Receiving Counseling (CSLG) and Control Subjects (CTRL), for Both Perceived Health and Perceived Physical Fitness

| GROUP | SOURCE | pre-intervention | post-intervention | t-value | Prob. |
|---|---|---|---|---|---|
| CSLG | overall health | 4.29 | 4.93 | 2.86 | 0.01 |
| CTRL | overall health | 5.00 | 5.56 | -2.26 | 0.04 |
| CSLG | health compared to others | 4.21 | 5.21 | 3.02 | 0.01 |
| CTRL | health compared to others | 5.17 | 5.78 | 1.83 | 0.09 |
| CSLG | overall fitness | 3.57 | 4.43 | 3.12 | 0.01 |
| CTRL | overall fitness | 4.28 | 4.94 | 2.29 | 0.04 |
| CSLG | fitness compared to others | 4.08 | 5.00 | 3.12 | 0.01 |
| CTRL | fitness compared to others | 4.83 | 5.22 | 1.80 | 0.09 |

4.1.5 Self-evaluation of Counseling Intervention

As a part of the post-program assessment the subjects receiving counseling also provided information regarding their perception of the counseling situation. Table 4.15 summarizes the descriptive information, which reveals that the subjects perceived the counseling situation as very positive regardless of their actual physical activity behavior. Since it was hypothesized that those subjects who perceived the counseling situation more positively would also indicate greater physical activity involvement following the intervention, Pearson product-moment correlations were computed to determine the association between the exercise behavior after the program and the individual variables assessing the subjects' perception of the counseling. No meaningful pattern of results was evident. Although there was considerable variability in physical activity behavior, the

uniform evaluation of the counseling intervention prevented the confirmation of any association among variables (Table 4.16).

Table 4.15

Descriptive Statistics for Variables Assessing the Subjects' Perception of the Counseling Situation

| | Minimum | Maximum | Mean | SD |
|---|---|---|---|---|
| Comfortable | 2.0 | 7.0 | 6.2 | 1.6 |
| Too personal | 3.0 | 7.0 | 6.5 | 1.1 |
| Encouraging | 6.0 | 7.0 | 6.8 | 0.4 |
| Giving advice | 3.0 | 7.0 | 5.6 | 1.6 |
| Caring | 6.0 | 7.0 | 6.9 | 0.3 |
| Wanted to help | 6.0 | 7.0 | 6.9 | 0.3 |
| Increased confidence | 5.0 | 7.0 | 6.0 | 0.8 |
| Confident to remain active | 5.0 | 7.0 | 6.4 | 0.8 |
| To please the counselor | 1.0 | 7.0 | 5.1 | 1.8 |
| Following advice | 1.0 | 7.0 | 5.4 | 2.0 |

## 4.2 Qualitative Analyses

### 4.2.1 Summary of Case Reports

The exercise adherence process for each individual case was analyzed to determine the different effect of the various intervention components (e.g., goalsetting, self-monitoring, relapse prevention, etc.). The perceptions of both the individuals and the counselor were considered by utilizing the information from the weekly diaries and the counseling notes. According to Locke (1989), qualitative research methods provide answers to questions that arise from people living in particular social environments. In this case, a summary which simply tabulated all cases would not have done justice to the variety of reasons that were important to each individual's adherence. A tabulation would also have required the categorization of each comment or gesture — a task which would have been next to impossible since many comments combined an array of topics and could have

been categorized in more than one area. Therefore, a general qualitative description of trends was done. A summary of these qualitative descriptions follows, the analysis for each individual case, which utilizes the same format, can be found in Appendix A.

Table 4.16

Pearson Product-moment Correlation Coefficients for Measures of the Subjects' Perception of the Counseling Situation and (a) Actual Physical Activity Involvement (Post-study) and (b) Percentage Change of Physical Activity Involvement

| | post-study | % change post-intervention |
|---|---|---|
| Comfortable | -0.40 | 0.44 |
| Too personal | -0.62 * | -0.13 |
| Encouraging | 0.55 * | 0.15 |
| Giving advice | -0.40 | 0.06 |
| Caring | 0.04 | 0.20 |
| Wanted to help | -0.04 | -0.20 |
| Increased confidence | 0.33 | 0.20 |
| Confident to remain active | 0.54 * | 0.32 |
| To please the counselor | -0.04 | 0.72 ** |
| Following advice | -0.14 | 0.16 |

Note. * denotes alpha level of 0.05; ** denotes alpha level of 0.01.

Exercise history. The majority of the participants grew up on farms or in rural communities and therefore nearly all attended very small schools and had very limited exposure to formal exercise. Even when compared to rural areas today, organized sport activities "in those days" were not common in general and were even less common for girls. In a few cases, however, girls were allowed and were actually welcomed to participate because of a shortage of boys (Subjects A3, B5, D1).

One common activity for some subjects (Subjects A1, B1, D2, B4) was farm chores, which was considered physically demanding and not fun or pleasureable. Therefore, although these individuals had a physical exercise stimulus, it lacked one of the most fundamental characteristics of sport and play activities — enjoyment.

Walking was a common mode of exercise for all the subjects. At that time it was because there simply was no other means of transportation; it should, however, be noted that the majority of the subjects expressed that despite not having a choice, they enjoyed walking and still do. In comparison to the children/adolescents of today, the subjects believed that they walked far more frequently and further.

Since there was far less or no public entertainment (e.g., television, movies, and arcades were not known or available) the subjects were responsible for their own enjoyment and entertainment. Enjoyment, fun, and socializing were thus common reasons for early participation in physical activities. For many, enjoyment and socializing were synonymous. The subjects found it difficult to distinguish between enjoyment caused by an activity and activity done for the sake of enjoyment. Of lesser importance to the subjects was the need for competition or challenge. This was likely fostered by social norms (e.g., girls do not play certain sports) and the unavailability of competitive programs. These findings are consistent with McPherson's (1986) observation that the perception of sport as a socially accepted behavior has changed during the seventies and eighties. McPherson also considers societal approval to be directly linked to the availability of exercise programs, which in turn is a key element for fostering exercise behavior.

While the amount of exercise involvement varied between subjects as they grew up, a common characterisitic was a significant decline in exercise involvement with age. The patterns for this exercise reduction were quite consistent — during their youth, the subjects were moderately active when compared to adolescents of today (for many this was a result of being confronted with farm duties on a regular basis); and in their early adulthood nearly everybody's exercise level declined because of work and/or family commitments. A very few (Subjects B3, A2, A4) expressed that they had the desire to stay more physically active through their mid-years but outside commitments were usually too overwhelming for them to do anything but go for occaisional walks. This trend is also evident in Campbell's Survey of Well-Being (Stephens & Craig, 1990) which reported a definite decline of physical activity involvement during the mid-years (35 to 55 years of age) and that walking was the most common physical activity.

A few of the subjects (Subjects B1, B2, A2, C2) had taken exercise classes within ten years prior to the study but most did not remain with it for more than one season, for reasons such as dislike of the activity, physical discomfort caused by the activity, and time inconvenience. In two cases (Subjects B1, B2), the organizer discontinued the program. These observations warrant some consideration. Five to ten years ago these individuals were in their fifties and most of them were still working and feeling pressured regarding

their discretionary time. Also at that time, exercise for the mature adult had just started to become socially acceptable (see McPherson, 1986) and the availability of programs was limited. Moreover, fitness instructors had to be familiarized with the special needs of the mature adults in order to modify exercises to make them age-appropriate (MacNeil & Teague, 1987). The most critical characteristic of that time period was a widely shared belief among older adults that there was no need for exercise and that it was actually unsafe to exercise after a certain age (Mobily, 1982). Many subjects in this study confirmed this view in that although they were in favour of and probably would have supported organized and age-appropriate physical fitness classes, limited program availability in the community prohibited this from happening.

Reasons for initiating exercise. In agreement with Deobil's (1989) observation of an accumulation of health debilitating conditions among the older age cohort, the individuals in this study were not completely free of health-related problems. In fact, the subjects unanimously perceived their health or health-related issues to be major reasons for them to increase their current physical activity involvement. Quite realistically, they expected and hoped to optimize their current health status rather than solve all their health problems. In agreement with findings reported by DeBendette (1988), the goal was to remain functionally independent for as long as possible. The individuals' reports of their current health status and physical fitness were accepted at face value.

Individuals who were either older or who had more serious health problems interpreted improvement or maintenance of their current health status as a major contributor to the potential for remaining independent (Subjects B1, D1, D2). They saw exercise as a means of possibly preventing further deterioration of such physical attributes as flexibility and endurance. The desire among older people to be able to move without confinement, to make decisions on when and where to go, and to be generally independent of assistance, have been reported elsewhere (DeBendett, 1988; Jordan-Marsh, 1988) and is a valid consideration for an aging population (McPherson, Curtis, Loy, 1989).

The subjects perceived physical fitness to be a part of their health and felt that health improvement could be indicated by activities of daily living becoming less physically demanding. The criteria the individuals used to assess their own physical fitness were personal and not objectively defined. For example, Subject C2 felt improvements in her health were reflected in her ability to walk at a faster pace; Subject A5 evaluated feeling less stress when running up and down stairs as a health benefit; Subject B1 considered greater ease in vacuuming to be a positive health effect; Subject B3 regarded increased ease in shovelling snow as health improvement; and Subject D2 equated feeling more comfortable

when carrying the groceries with health benefits. In accordance with MacNeil and Teague (1987), improvements are noticed in areas that are meaningful to individuals.

Weight control and weight reduction were the most prominent physical reasons for initiating exercise. Ten subjects (and not all of them were visibly overweight) stated that they would like to lose weight and/or tone their muscles. For some it was more a matter of appearance whereas for others it was a critical question of physical health (Subjects B4, C1, C2, D1).

Exercise for the purpose of socializing appeared to be a minor factor during the initiation phase, but some participants (Subjects A1, A4, A5, B3) noted it increased in importance during the progress of the program. These subjects participated in either aquasize, bowling, or walking with others. Socializing through participation and experiencing enjoyment as a result of participation in an activity has repeatedly found support in the literature (Myers & Hamilton, 1985; Siegel et al., 1988; Thornton & Collins, 1986).

In conclusion, a multidimensional legitimation for exercise inititation and subsequent exercise maintenance, as supported by various researchers (Haskell, 1989; McPherson, 1986; Shephard, 1989; Sloan, 1989), was noticed.

Goal-setting. Although everyone stated reasons for initiating exercise, not everyone set specific goals. Three subjects (Subjects A3, A5, B4) indicated exactly what physical fitness meant for them and/or how much weight they wanted to lose. The majority of subjects, however, stated their goals more generally (improving physical fitness or losing weight) and further probing did not trigger them to make these objectives clearer. Only those who posed specific objectives were considered in this section and allowed achievement evaluation.

Specific and observable goals were set by Subject B2 and Subject C2, who stated a weekly exercise level which they would try to achieve. As indicated in the individual progress reports, both subjects were successful in that they accomplished their stated goals. Another goal expressed by three subjects did not exist in the beginning but developed as a result of participation. The three subjects (Subjects A1, A4, A5), who lived very close to each other and who started walking together immediately after the introductory lecture, built a social support system which they did not want to give up, and consequently determined this as one of their goals.

Decision-balance sheet. It was not surprising that the responses found on the decision-balance sheet were clearly in favour of exercise involvement. Since the subjects

had already made decisions at the time the questions were posed, it was merely a retrospective justification of their intended behavior. Anticipated gains were not specific and were generally described as "improvement of health", which meant different things to different individuals.(e.g., Subjects A5, B3, C1, C2, D1, D2 - feel better physically; Subject B1 - improved stamina). Moreover, almost everyone expressed an anticipation of improving their psychological well-being (e.g., of becoming a happier person and relieving stress). It was noticed that anticipation of physical benefits was more pronounced among subjects who were physically more disadvantaged (see subject classification and Figure 4.3, page 80).

In administering the decision-balance sheet, the subjects were also asked about expected outcomes from their exercise involvement and behavior approval from significant others. All subjects expected benefits for themselves to accrue. It was, however, surprising that the majority of respondents had difficulty imagining how their own physical activity involvement might affect others.

It is remarkable that almost nobody recognized or wanted to recognize any disadvantages that might be associated with their decision to exercise more regularly. The only responses in this regard, and they were more in jest than serious, reflected not having time for oneself or for the spouse (Subjects A3, A4, B3).

In summary, the responses to anticipated exercise effects were consistent with the initial reasons for starting to exercise, and the recognition of possible drawbacks associated with exercise were negligible. The responses were indicative of the socially desirable attributes of being active - being physically fit, feeling well and emotionally satisfied, enjoying life and recreational activities with others, and doing something for one's health. The findings from the decision-balance sheet reflected McPherson's (1986) observation of increased societal acceptance of physical activity behavior for older adults. Even more encouraging is the observed trend toward subjects accepting greater self-responsibility for preventive health care actions.

Self-monitoring. A large proportion of the subjects increased their physcial activity involvement immediately after the introductory lecture, prior to the counseling but with the beginning of the self-monitoring. Unfortunately, it is impossible to determine how much of this increase should be attributed to the lecture and how much to the self-monitoring. According to the responses of the individuals, the self-monitoring had a significant impact on their exercise involvement because it increased their awareness of their activity behavior and they wanted to avoid the embarrassment of submitting a diary without entries. The positive effect of self-monitoring on increasing physical activity adherence supported

reports in various studies (Juneau et al., 1987; King et al., 1986; Noland, 1989). The submission of self-reports seemed particularly effective with these members of the older age cohort because subjects repeatedly commented on their commitment to the study. Many (Subjects A1, A3, A4, A5, B2, B3, C2, D2) felt they had to exercise so that entries could be made in the diaries. Whether the effectiveness of such a self-monitoring technique is age-related warrants further investigation in future research.

Self-monitoring is conceptually comprised of two facets - the keeping of a diary and increasing the awareness of one's activities. Recognizing the distinction between these two facets is important when considering the long-term use of self-monitoring by the subjects. While only two subjects (Subjects A2, B5) considered the completion of the diaries to be a bother, only a very few (Subjects A1, A4, A5, C2) contemplated extending the use of such a recording strategy after the termination of the program. Another self-monitoring strategy, individual graphing of weekly exercise involvement, was discussed during the counseling sessions but was not well received by the respondents. This was probably because graphing is more abstract than writing down specific activities, and the subjects may have never been exposed to such a task (Subject B5). Consistent with Levy's (1986) and Owen et al's (1987) remarks on the utilization of written information, it was found that messages (i.e., what to do) have to be clearly understood and must be purposeful to be effective.

Attribution of success. The aspect of to whom or to what to attribute success or failure was of significance in just a few cases (Subjects A2, A5, B2, C1, C2). These subjects had rather distorted interpretations of their responsibility for behavior outcomes in that they had the initial belief that, regardless of surrounding factors and conditions, they were totally and personally responsible for any "failure" to be active. Since these attributions did not reappear at a later time, it might be assumed that a positive contribution of the counseling was helping these individuals to recognize the uncontrollability of certain events (e.g., Subject A5 - going on a vacation with a tour group restricts the freedom of choice of what to do more than going on an individual vacation; Subject D2 - a sound justification for the inability to walk are defect orthotics but not missing company while walking).

Writing a contract. Only one subject (Subject C2) used the writing of a contract as a viable means of helping her to improve her consistency to exercise. However, a number of subjects had a positive predisposition towards a written commitment and accepted it as a viable option despite failure to apply it. It is speculated that, for many, the utilization of a written commitment was curtailed by the lack of sufficiently specific goals. For example, "improving physical fitness" may be a sufficient goal for a general activity commitment, but

it lacks the specificity necessary for operationalization in a consequence statement of a contract. It is also speculated that the subjects may have feared that they would be giving up their freedom of choice on what to do if they had written a contract. As well, subjects may have considered making a committment to the study in the first place to be a "verbal contract". Evidence for this proposition was gathered indirectly through comments of the subjects (e.g., Subject D2 - compelled to complete the study; Subject A4 - will walk less once the study is finished). In order to elicit the writing and signing of a contract, more assertive action would have had to be taken. It is debatable whether such action may have resulted in a decreased perception of choice and a subsequent withdrawal from the program. Both providing assertive assistance through counseling (Egan, 1982; Janis, 1983) and creating opportunity for perceived choice (Wankel, 1985) are beneficial to the adherence process; the problem in this study may have been finding an optimal level for both.

Social support system. Although the utilization of a social support system had a direct effect on only half of the subjects (Subjects A1, A2, A3, A4, A5, C1, C2), it was extremely important for them. Two subjects (Subjects B3, B4) who did not have a support system at the onset of the study tried to establish one, while several subjects (Subjects B1, B2, B5, D1) expressed that they could not expect social support from their spouses and indicated that a useful support system for them would have been an organized fitness class. One subject (Subject D2) was apprehensive of the possibility of approaching "strangers" for the purpose of increasing her own exercise compliance.

The social support systems that did exist can be categorized into three groups: (a) active encouragement, through inviting or accompanying one to exercise, (b) passive encouragement, through reminding and providing verbal and assistant support (e.g., Subject C2 - driving to exercise site), and (c) a multi-support system, in which subjects had different sources of encouragement (e.g., Subjects A1, A4, A5 - friends provided active support by inviting them to exercise, and family members supported with encouraging comments). Verbal support for acknowledging physical improvements (e.g., Subject B4 - "you lost weight") provided reinforcement for the recipients and subsequently led to continued participation. Generally, spouses were a consistent and very effective source of encouragement (as long as positive marital communication existed). Two subjects (Subjects B3, B4) substituted external support (e.g., golfers, bowlers) for spousal support.

In agreement with various researchers (Levy, 1986; Daltory & Godin, 1989; Sallis et al., 1987; Wankel et al., 1985), the findings were that social support played a prominent role in adherence behavior. Individuals were motivated in adhering to exercise on the basis

of direct encouragement from significant others (e.g., inviting to walk) and indirect support originating from enjoying company of other exercisers (e.g., socializing, deriving pleasure from a situation).

Self-reinforcement. Self-reinforcement associated with the accomplishment of anticipated goals or expectations, was largely based on the individuals' reasons for being physically active. For example, Subject B4, who hoped to improve her physical fitness by losing weight, accomplished her goal which in turn reinforced her decision to be physically active. It was evident that self-reinforcing conditions were found only among those subjects who were physically capable of exercising.

Physical changes may have been the strongest sources of reinforcement. For the individual subjects, some reinforcers were easier to observe (e.g., weight: Subject C1 lost 12 pounds) than others (e.g., Subject A5 - cardiovascular response efficiency, strength, or flexibility) which may affect the long-term effectiveness of self-reinforcement. All positive changes, however, had a significant reinforcing value in that activities of daily living were then accomplished more easily. General improvements in "well-being" incorporated an array of different sectors and found their realization in a state of satisfaction with the current situation. Examples of "feeling better", "better mood", and being "more energetic" were common exercise adherence reinforcements (Subjects A1, A2, A4, B3, C1, C2).

The existence, awareness, and subsequent utilization of reinforcers reflects a hierarchy. It would appear that after investigating the occurrence of positive exercise outcomes, the counseling contributed positively in raising the awareness of various positive outcomes and assisted individuals in using this knowledge for continued exercise motivation.

Relapse prevention. Exercise relapse prevention is quite different from drinking or smoking relapse prevention. A day of physical inactivity does not have the same consequences as relapses to drinking or smoking; in fact, rest days are necessary and particularly crucial for the novice exerciser. In the beginning, some subjects (Subjects A2, C1, C2) had to be made aware of this fact as they put themselves under too much pressure by wanting to exercise daily.

It was not surprising that during the short period of contact none of the subjects experienced a serious relapse. The majority of subjects anticipated reduced involvement over the Christmas-New Year holidays, but everybody expected to return to their previous levels. These declines occurred as predicted and, in most cases, were followed by increases.

The majority of subjects did not feel any vulnerability because of their previous experiences with exercise benefits, but a few (Subjects A3,B1, B2, B3, C2) did adopt some relapse-preventing strategies (e.g., scheduling activities, planning to join organized groups, or looking for exercise alternatives to substitute or compliment existing activities such as indoor walking, home-based calisthenics, following television exercise programs, or riding a stationary bicycle). A variety of individualized approaches successfully helped to prevent a return to a sedentary lifestyle.

Boredom represented a controllable but very realistic relapse possibility. To avoid boredom, several subjects (Subjects A1, B3, A2, A3, B5) planned a variety of activities, while others joined an organized fitness class. Surprisingly, many subjects (9 of 14) mentioned that joining age-appropriate exercise classes would be their preference. This option was limited, however, as the only organized class was an aquasize class, which was known for being crowded.

Summary. Although the majority of the subjects noticed physical health benefits, an even greater proportion noted positive psychological effects. In fact, only two subjects (Subjects B1, D1) did not comment that they felt their perceived well-being had improved. Because a sense of improved well-being is not necessarily consistent with actual physical changes, it was concluded that increased involvement and in many cases, just an increased awareness of involvement, was sufficient to alter the perceived psychological well-being of the participants. Although these improvements were not completely independent of reaching anticipated levels of physical fitness, they were achieved at levels which appeared lower than was necessary for many physical changes to occur.

With respect to exercise adherence, the positive effect of deliberately creating and using a social support system cannot be overestimated. It is, however, important to distinguish between a social support system and socializing as a result of being together with somebody. The support system has the objective of encouraging an individual's goal, but it is not essential to actively support individuals by accompanying them — support can also be given verbally and by providing an exercise conducive environment.

### 4.2.2 Subject Classification

The case analyses suggested that the subjects' perceived health and social support system consistently affected their physical activity behavior. Consequently the subjects were classified into one of four groups: (a) no major physical health constraints and high social support, (b) no major physical health constraints and limited or no social support, (c) major physical health constraints and high social support, and (d) major physical health

constraints and limited or no social support. "Major physical health constraints" or lack thereof refers to the existence or absence of chronic physical disabilities such as the proneness to osteoarthritis, minor heart condition, obesity; it did not include acute illness. In one specific case (Subject B5) the subject was indirectly affected by the severity of her husband's chronic mental disability (Alzheimer's disease) and was classified as health constrained although it did not impose an actual physical restriction to herself. "High social support" or lack thereof denotes the existence or absence of active (e.g., accompanying the subject in an activity) or passive support (e.g., reminding the subject of an activity, providing transportation to the location of the activity) by family or friends. Based on these references, the subjects' grouping is shown in Figure 4.3.

Five subjects were classified as having no major physical health constraints and receiving a relatively high level of social support. The physical activity involvement of these subjects was much higher during the course of the study than it was prior to the study. After justifying excuses for not exercising (e.g., acute illness, family matters), an overall increase in exercise involvement during the counseling period was realized for Subject A3, Subject A4, and Subject A5 while it remained very consistent for Subject A1 and it decreased for Subject A2. Despite missing several days of exercise, the subjects were highly committed, as was demonstrated by the fact that none of these subjects had problems increasing their involvement after several days of abstinence. Acute illness accounted for the largest portion of missed exercise opportunities, which was regarded as "sensible decision-making" rather than "non-adherence to exercise".

The social support system varied among the subjects. All found some level of support from their spouses, who verbally encouraged and at times accompanied their activities. In addition to spousal support, all subjects received active encouragement from external sources like friends (Subjects A1, A4, A5) or, indirectly, other participants in groups (e.g., yoga class, aquasize class). Subject A1, Subject A4, and Subject A5 also experienced immense support by joining each other for some of their exercise walks.

Five subjects were classified as having no major physical health constraints and experiencing only limited or no social support. For example, Subject B5's physical activity involvement reflected the level and amount of caregiving she had to provide to her husband who was afflicted with Alzheimer's. Other members of this group forwarded a number of other reasons for being temporarily physically inactive (e.g., attending a convention, Christmas season, vacation, etc.). Generally, the days of exused absence were quite limited, which was also reflected in a relatively stable pattern of physical activity involvement. Subject B2 and Subject B4 increased their amount of involvement from the

initial seven-day recall assessment. The same should also be said for Subject B3 whose initial measure was highly influenced by a season-related activity (see also case report). Subject B1 was the only subject in this group that demonstrated an obvious decline in her physical activity commitment. It should be noted, though, that Subject B1 was by far the oldest subject (80 years of age) in this study and despite not having any immediate health problems, she was more concerned about falling and possible fractures.

| No major physical health constraints & high social support | No major physical health constraints & limited social support | Major physical health constraints & high social support | Major physical health constraints & limited social support |
|---|---|---|---|
| Subject A1 | Subject B1 | Subject C1 | Subject D1 |
| Subject A2 | Subject B2 | Subject C2 | Subject D2 |
| Subject A3 | Subject B3 | | |
| Subject A4 | Subject B4 | | |
| Subject A5 | Subject B5 | | |

Figure 4.3 Subjective classification of subjects receiving counseling according to their physical health and social support as displayed during counseling sessions.

Three subjects (Subjects B2, B4, B5) in this group were married but did not experience any kind of encouragement from their spouses. In fact, with respect to their exercise involvement they felt emotionally detached from their spouses. Limited social support from family members and from other participants in bowling, floor curling, and/or aquasize programs was reported by Subject B3 and Subject B4.

Having major physical health constraints while at the same time receiving a relatively high level of social support was found in two cases (Subjects C1, C2). For Subject C1, the exercise limiting factor was evident in a severe weight problem which caused a negative self-perception and a feeling of embarrassment when others (including her husband) saw her exercising. Due to a relatively poor level of physical fitness, Subject C1 was limited in the amount of exercise she could tolerate. The same was the case for Subject C2 who as a diabetic could control some of her illness through exercise, but only

as long as she exercised within limits. This fact led to a relatively stable exercise pattern which was interrupted only by her husband's death towards the end of the study.

Both subjects reported receiving immense encouragement from their spouses. In both cases spouses verbally encouraged their wives' actions to exercise for the improvement of their current health status. Subject C1's husband also occasionally accompanied her on exercise walks, but Subject C2's husband was physically unable to provide such assistance.

Two subjects (Subjects D1, D2) were categorized as having major physical health constraints and experiencing limited social support . Although the individual restrictions cannot be compared(see also case reports), they resulted in similar constraints on their personal choices to be more physically active. Subject D1 was handicapped for greater parts of the study due to two acute arthritic flare-ups. Subject D2 experienced a rather lengthy period of absinence at the end of the study due to a viral infection. Despite these externally imposed conditions, the intentions of both subjects to to be physically active remained positive throughout the study.

Social support for both Subject D1 and Subject D2 was very limited as neither received any spousal, familial, or other external support. Due to their physical restrictions, the potential for both subjects to participate in exercise classes outside their homes was also limited.

## 4.3 Synthesis of Quantitative and Qualitative Results

In comparison to control subjects, subjects receiving counseling did not show an increase in physical activity involvement after the intervention. The subsequent qualitative analysis of the individual cases thus investigated how the adherence process to a more physically active lifestyle was mediated by personal reasons and socio-environmental constraints as well as the intervention. A synthesis of the data from both quantitative and qualitative sources showed that similar factors (e.g., personal, situational, and environmental) influenced the adherence process, regardless of the treatment condition.

When the effectiveness of an intervention is being investigated, between-group and within-group homogeneity prior to the intervention must be established because the assessment of treatment effectiveness is invalid if subjects do not come from a homogenous sample. In this study, the quantitative results indicated that the dependent variable, physical activity involvement, did not differ statistically betwen groups (Table 4.1, page 53). Large standard deviations for both groups did, however, question within-group

homogeneity. Qualitative data also suggested substantial within-group variability. This confirmed the contention that it is common to see large cohort heterogeneity among older adults (Carter et al., 1989; McPherson, 1986).

Extreme within-group variability has implications for the evaluation of an experimental design in that (a) very large samples are necessary to demonstrate the differential effect of an intervention, (b) subjects may be used as their own control to indicate a treatment effect, or (c) non-parametric statistics may be used to avoid statistical noise due to immense within-group variability. Due to the labour involved when counseling individuals, the sample size of this study was limited. Consequently, to allow for the evaluation of each individual's adherence process, the measure, physical activity involvement, was assessed repeatedly, and a non-parametric test statistic (i.e., chi-square test of homogeneity) was used to investigate treatment-related changes. The quantitative results (Table 4.4, page 59) suggested a similar trend for both groups — the intervention did not have a differential effect on physical activity involvement, the outcome variable. However, the qualitative information revealed how several "non-intervention" factors influenced the subjects' intention to be physically active. Of those, the subjects' perceived health and the social support system emerged as the most prominent factors. The effect of the comparability of the activities and the relationship between physical activity involvement and the subjects' personal ceiling value of activity tolerance are also worth mentioning, however.

### 4.3.1 Health

Health was included in this study because of its reported relationship with physical activity involvement (Bocksnick, 1989; Myers & Gonda, 1986). The results confirmed a report by Deobil (1989) who identified health as a mediating variable for the exercise behavior of older adults. In contrast to the subjects receiving counseling, control subjects rated themselves significantly healthier before and after the study (Table 4.2, page 54 and 4.10, page 65). Although this observation was based on self-reports, there was no apparent evidence to question them. In agreement with Davies and Ware (1981), who validated self-rated health reports by comparing them to physician ratings, the self-reports of the subjects were accepted at face value.

The individual case reports indicated that the subjects who received the counseling treatment were repeatedly affected by incidences of ill health (ranging from viral infections to arthritic flare-ups, with some being shorter and less severe than others) which usually resulted in inconsistent exercise adherence. Acute sickness was judged as a sensible and justified reason for exercise abstinence. Statistically significant differences in self-rated

health prevailed throughout the study between members of both treatment groups (Table 4.12, page 67), with control subjects consistently reporting better health.

When subjects indicated factors that inhibited their exercise behavior in their weekly diaries, it was noticed that subjects in the control group reported physical ailments as exercise constraints less fequently than did subjects in the counseling group. In fact, a majority (11 of 14) of the experimental goup reported at least one occasion during the course of the entire program (i.e., September until March) during which they were unable to exercise because of ill-health. This may have been because the subjects receiving counseling were made more aware of the reciprocal relationship between health and exercise. Also noteworthy, however, is the trend among the subjects receiving counseling to return to regular exercise behavior as soon as possible following the recovery from an acute health condition.

Not only self-reported health but also the health condition of a significant other can be a potential threat to personal exercise commitmment. This was illustrated by Subject B5 who cared for her husband who had Alzheimer's disease and often found she lacked energy and/or time to engage in exercise. This information, which was unretrievable from the quantiative measures, was crucial for a valid evaluation of her volition to adhere to exercise.

Despite showing statistically significant increases from their pre-study to post-study assessments, subjects in the experimental group consistently reported lower levels of physical health than those in the control group (Table 4.12, page 67). The interviews supported the statistical evidence for improvements in personal health among the subjects in the counseling group, although they chose to refer to these changes in a rather general manner (e.g., "feeling better"). Evidence for more substantial improvements in personal health may have also been limited by the duration of the study. For subjects who were less healthy at the onset of the study, a six month period may have been insufficient to obtain a level comparable to that of one of the healthier subjects.

In summary, the individual case analyses provided strong support for a positive attitude and behavioral commitment towards regular physical activity. All subjects adhered to their intention to be physically active on a regular basis unless acute health or other justified reasons (e.g., bereavement) interfered. The qualitative data supplemented the quantitative data by providing valuable information on (a) the scope of health-related factors, (b) the potential influence of health on the intention to engage in physical activities, (c) and the wide range of perceived improvements.

4.3.2 Social Support

Quantitative measures were not used to assess the subjects' perception of the influence of social support on their intention to be physically active. However, the qualitative information from counseling sessions and diaries showed a variety of levels of social support. On the basis of the interview information, it appeared that active support (e.g., joining somebody in exercise - Subjects A1, A2, A3, A4, A5) was most powerful, while verbal but passive encouragement was slightly less effective. This support represented an important factor in the exercise adherence process but it was relatively less important than the individuals' health status. These findings confirm previous adherence research focusing on the impact of social support (Levy, 1986; Daltroy & Godin, 1989; Sallis et al., 1987; Wankel, 1985). With positive health being a prerequsite to exercise behavior, social support has repeatedly been shown to be a viable source of motivation for the adherence process. (Knapp, 1988; Wankel, 1988a). It is also important to note that marked differences exist in the social support systems available and these must be considered when evaluating the adherence process because these differences are likely to have a variety of influences on behavior compliance. In this study, the benefits from existing social support systems with respect to adherence to exercise was disclosed through the individual case reports.

4.3.3 Activity

A variety of activities (e.g., stretching, floor curling, aquasize) were included in the physical activity repertoire of the individuals involved in the study. The subjects were required to report type of activity, duration of involvement, and perceived level of intensity. Regardless of the nature of the activity, the dependent variable was computed as the sum of all activities. Both quantitative and qualitative data disclosed a considerable range in physical activity involvement among the subjects.

Seasonal activities (e.g., golf) did not have a great influence on the exercise behavior of the majority of subjects. Rather, individual preferences for certain activities (e.g., group-based activities such as floor curling and bowling or individual-focused activities such as walking and stretching) appeared to have a considerabe effect on the variability among the subjects. The comparability of activities must be considered because of its effect on the results.

The diaries revealed preferences for some individuals to engage in group-based activities (e.g., in floor curling, bowling, etc.) which generally lasted 90 minutes to 2 or even 3 hours, while other individuals preferred individual and more fitness-oriented activities, which rarely exceeded 45 minutes in duration. Seven subjects in the control

group reported extensive involvement in group-based activities while only one subject (Subject B4) from the experimental group did so. The importance of this observation is that the activity involvement of the control group was positively skewed due to the inflated scores of those seven individuals (Table 4.6, page 61). To consider all activities equal was a difficult choice made for this study. Physical activities which have a strong social component (e.g., floor curling) tend to be more time consuming but to judge whether or not they contribute equally to health and fitness when compared to "exercise-oriented" activities (e.g., aquasize) was beyond the scope of this study.

4.3.4 Subjects' Personal Ceiling Value for Activity Involvement

An individual ceiling value is the amount of time that can be committed to exercise without neglecting other demands (e.g., husband, friends, housework). The existence of ceiling values and their relationship to the subjects' intentions to be physically active is an observation that warrants attention. The influence of an already existing level of involvement in established activities (i.e., including social commitments, volunteer work, etc.) cannot be underestimated. Prior commitments influence a subject's perception of how much time can be devoted to exercise and must also be considered when evaluating a behavior change towards adopting exercise. Subject B4 experienced both influence and constraint from other activity commitments. Despite bowling and floor curling for several hours per week, she believed that her activity involvement prior to the study was at a level which was too low to result in any physiological benefits. Since Subject B4 did not want to reduce her socially-focused activity involvement it was extremely difficult for her to incorporate other, more fitness-oriented activities into her schedule without exceeding her individual ceiling value. For Subject B4, a positive change in her exercise behavior would be, one that would contribute more to her physical health than to her desire to socialize. She would, therefore, have to change activities. Subject B4 did, in fact, modify her activity involvement by substituting stretching exercises, riding a stationary bicycle, and walking for some "social" activities but did not stop the other activities entirely. She did not reduce or increase her overall activity involvement, but given her own constraints it was concluded that Subject B4 accomplished her goal. The quantitative expression of her exercise involvement did not reflect changes that took place.

Compared to control subjects, subjects who received counseling reported to a significantly greater degree that the program was effective in assisting them to reach their goal (Table 4.8, page 63). On the basis of the individual case reports, it is observed that most subjects experienced gains similar to the ones described for Subject B4. This is supported by the statistical finding that subjects receiving counseling reported a

significantly greater use of the information that had been made available to them. The interviews provided evidence that the subjects became more cognizant of their involvement, which can be described as increased mindfulness (Langer, 1989).

> Mindfulness is expressed in active information processing, characterized by cognitive differentiation: the creation of categories and distinctions. The act of creating distinctions tacitly creates new categories and vice versa. The distinctions drawn may be judged to be major or minor, but they are mindfully drawn just the same. Mindfulness may be seen as creating (noticing) multiple perspectives, or being aware of context. (Langer, 1989, p. 138

It is obvious from this discussion, that the effectiveness of the short-term counseling intervention cannot be evaluated by using change in exercise involvement as the sole criterion. The quantitative data provided useful information with respect to activity patterns, but it was the qualitative data that contributed to the information of a change in behavior content.

# CHAPTER 5 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

## 5.1 Summary

The purpose of this study was to investigate the effectiveness of short-term counseling for facilitating regular physical activity involvement in non-institutionalized female older adults. A pre-test, post-test, quasi-experimental design was used to determine changes in the physical activity behavior of 32 females (mean age = 65.87, SD 5.66) who stated the intention to increase their exercise involvement. Following an introductory lecture focusing on the benefits of exercise for older adults, volunteer participants were assigned to one of two treatment conditions. Each of the experimental subjects (N = 14) received exercise adherence counseling sessions on six occaisions. The counseling sessions were based on Janis' (1983) guidelines for short-term counseling. At the end of each session, the experimental subjects were also given written summaries of the topics that had been just discussed. The control subjects (N = 18) received only the written information. Between October 2, 1989 and March 18, 1990, all subjects submitted seventeen weekly diaries in which they had recorded, on a daily basis their physical activity involvement. The diaries included information on type of activity, duration of activity involvement, and their perception of the level of intensity of involvement. The subjects also completed pre- and post-study questionnaires which assessed their self-rated health and physical fitness and their perception of the effectiveness of the intervention (post-study only). Additional information for the experimental subjects was attained from field notes taken during the individual counseling sessions. The evaluation of the data for the study involved a combination of quantitative and qualitative analyses.

Quantitative analysis, physical activity involvement. The groups showed very similar patterns in their exercise behavior. Involvement increased immediately following the introductory lecture and with the beginning of the self-monitoring, and was maintained thereafter. There was no statistically significant differences in the measures of physical activity involvement (i.e., time of involvement, frequency of exercise bouts, and number of different activities) between subjects receiving counseling and control subjects, following the short-term counseling intervention. The hypothesis of a differential effect as a result of the treatment was rejected. The following considerations are relevant when interpreting this unexpected result.

1. Some subjects were physically unable (e.g., due to poor health) to respond to the counseling program in the hypothesized direction (i.e., modify their behavior), at certain times during the intervention.

2. The immediate increase in physical activity involvement which coincided with the introductory lecture and the beginning of the self-monitoring may not have allowed for any further improvement as personal ceiling values regarding exercise tolerance may already have been reached.

3. Although the counselor may have succeded in establishing referent power, the counseling intervention was no better than the combination of introductory lecture and completion and submission of physical activity diaries.

4. The counselor did not establish referent power which meant he was doomed to fail in his attempt to assist the subjects who intended to adopt a more physically active lifestyle. This option is most unlikely since in the post-study questionnaire the subjects unanimously responded that referent power had been established and that the treatment was effective.

5. Large inter-subject variability with respect to activity levels within both groups adversely effected the sensitivity of the assessment of treatment effects. Even if treatment effects did occur such large "error variance" would preclude the finding of any statistically significant differences.

6. Preferences for group activities (e.g., floor curling) versus individual activities (e.g., riding stationary bicycle) affected the weekly duration of exercise involvement. The activity data indicated that group activities commonly lasted for more than sixty minutes whereas individual activities rarely reached such a level. When compared to experimental subjects, a greater number of control subjects participated in group activities, which naturally inflated the average score of exercise duration for control subjects

7. Increases in physical activity involvement early in the program and the maintenance of the involvement may have been due to undetectable extraneous factors.

Quantitative analysis, perceived health and physical fitness. At the initial assessment, statistically significant differences were found for measures of both perceived health and physical fitness. Control subjects considered themselves healthier and more physically fit than their experimental counterparts did. This meant, the experimental hypothesis of no difference had to be rejected. No reason was apparent that could explain this finding other than there were pre-existing differences in the two in tact community samples.

On the basis of the subjects' self-reports, when pre-study measures were compared to post-study measures, independently for both groups, statistically significant improvements regarding perceived health and physical fitness were noticed. Subjects in the experimental group reported greater benefits which narrowed their difference with control subjects.

Quantitative analysis, program evaluation. Subjects evaluated the entire program (introductory lecture, submission of weekly diaries, reception of written information, and counseling) positively, however, the hypothesized significant correlations between physical activity involvement and program evaluation (e.g., goal accomplishment, use of methods, etc.) did not materialize.

According to the quantitative analyses, the more labor-intensive individual counseling treatment did not add significantly to the increase in activity which occurred immediately following the introductory lecture and with the beginning of self-monitoring. It is speculated that the lecture may have served as a kind of group counseling for interested older adults who were sufficiently motivated to make personal changes as a result of their commitment to the study. It is an open question as to whether the personal counseling would show an additional advantage for maintenance of activity over and extended time period after the behavior monitoring was terminated.

Qualitative analysis of subjects' adherence processes. Poor health increased the likelihood of exercise regimens being interrupted or terminated. This was shown in the data by the fact that healthier subjects were more compliant than less healthy subjects. With this in mind, it follows that the chances of the control group remaining active were much greater than for the less healthy experimental group. Individual case analyses revealed the important influence of changing health on physical activity involvement during the program. Physical health was the primary influence on actual activity behavior with social support being second in importance.

Subjects in the counseling group rebounded from weather-related exercise abstinence, which might suggest that the strategies for dealing with exercise reinforcement and relapse prevention had been adopted.

The analysis of the individual case reports clearly identified that individual subjects valued different components of the counseling intervention program (e.g., decision-balance sheet, self-monitoring, or goal-setting). This finding supports previous research in indicating that there is no one superior modality for increasing exercise adherence (Dishman, 1988).

Methdodological concerns. This study raised a question concerning the appropriateness of using just quantitative measures to evaluate Janis' (1983) short-term counseling when applied to exercise behavior especially for an elderly population. The qualitative analysis of individual cases showed decisively that a number of factors

simultaneously contribute to or detract from adherence. Research involving members of the older age cohort appears to be trapped methodologically in that there is large inter-subject variability, which usually requires large samples to ensure homogeneous sub-samples. Despite an increasing number of older adults, it is not only unrealistic to expect an increasing number of volunteers, but also uneconomical to introduce more subjects into studies when a reduction in sample variability cannot be guaranteed. These logistical issues are especially limiting when investigating time-intensive counseling interventions such as the one in this study.

An important objective of applied research is to establish ecological validity by investigating how individuals respond to various interventions outside laboratory settings. In this study, it was found that a triangulation of quantitative and qualitative measures was useful in gaining greater insight into complex decision-making processes.

The unobtrusive assessment of physical activity involvement has been re-identified as a major problem when attempting to evaluate adherence. In home-based exercise adherence studies, the use of self-reports is a logical choice for tracing behavior changes, however, with it, there is always a chance for a Hawthorne-effect. This makes the quantification of the contribution of self-monitoring and other intervention modalities very difficult if not impossible. Multiple baseline studies have been recommended for dealing with such problems (and also with inter-subject variability) (Nesselroade & Ford, 1985).

## 5.2 Conclusions

Following both quantitative and qualitative data analyses, it is concluded that:

1. The study provided insufficient evidence to say that short-term counseling was more effective than a lecture combined with the dissemination of information in providing assistance to older adults who expressed the intention to increase their physical activity involvement. In using a 2 x 4 repeated measures analysis of variance, differences in exercise involvement of the two groups were investigated. Treatment and interaction effects were both non-significant. A statistically significant time effect revealed an increase in physical activity involvement following the introductory lecture, with the beginning of self-monitoring, but independent of the intervention. This finding, however, must be considered with caution. The quantitative analysis identified that experimental subjects evaluated the counseling positively regardless of actual increments in their physical activity behavior. The qualitative analysis, however, revealed that individuals' decision-making with respect to their exercise behavior was affected by both changing health and social

support in that subjects with poor health and a non-supportive environment had greater difficulties in complying with their intention to exercise.

2. The submission of diaries to a contact person (i.e., follow-up of a public commitment) and dissemination of information (i.e., introductory lecture) plus distributed printed material on a weekly basis may be considered potentially effective in helping to modify physical activity behavior of seniors. It is not known is for how long, and the degree to which both conditions operate successfully.

3. An increase in physical activity involvement was positively associated with changes in perceived health and physical fitness.

4. Health status is a limiting factor for initiating and sustaining exercise behavior in an elderly population.

5. The differences in between-subject preferences of various aspects of the counseling intervention (e.g., decision-balance sheet, writing of a contract, etc.) support the use of a multi-component intervention such as that used in this study. This may be of particular importance for subjects who are more resistant to behavior change and who do not immediately respond to adherence strategies such as information dissemination and self-monitoring.

6. The evaluation of treatment-differential changes of exercise behavior in older adults should target individuals rather than groups because of extreme between-subject variability (e.g., health, preferences, history, etc.).

## 5.3 Recommendations

On the basis of observations from the current study, the following recommendations for future research are offered:

1. Since problems of extreme between-subject variability may be inherent in research with older adults, it is recommended that analytic approaches in which individuals function as their own control be used. Despite a general North American bias toward the use of quantitative research methodologies, researchers who are interested in gerontological exercise research should seriously consider the use of qualitative approaches. As demonstrated in this study, repeated qualitative assessments during the individual counseling sessions were extremely helpful in explaining the activity behavior of the subjects.

2. To provide a true test of the effectiveness of short-term counseling in increasing and maintaining physical activity involvement, subjects must be matched on criteria such as health, physical fitness, availability of social support, and previous exercise involvement.

3. The simultaneous use of quantitative and qualitative techniques for data collection and data analysis appears to facilitate the detection of complex treatment effects (e.g., increase of exercise behavior) which may be influenced by a variety of variables.

4. Emphasis must be placed on developing an unobtrusive measure of physical activity involvement. This would enable researchers to attribute changes to a treatment effect (e.g., short-term counseling) rather than to an assessment tool (e.g., physical activity diary). Future studies should consider employing activity reports by significant others.

5. The short-term counseling approach should be tested with "problem individuals" who have evidenced repeated difficulties in adhering to their exercise intention (e.g., individuals who have repeatedly dropped out of physical activity programs).

6. The current study should be replicated with different counselors (based on sex, age, and counseling content) for identifying the effect of various different counselor characteristics on referent power and counseling effectiveness.

7. The counseling intervention should incorporate existing program opportunities for the target population. The case reports revealed that structured program opportunities provided personal and social environments that were effective in facilitating adherence.

8. Future research should investigate further whether the group lecture and the activity diary, singly and in combination, would have a beneficial effect upon activity involvement.

9. To identify the trends regarding physical activity involvement, perceived health, and physical fitness, subjects should be followed over an extended time period (e.g., in excess of 12 months).

10. To delve further into the development of the exercise adherence process of these subjects, it might be useful to question them on the past and current factors assisting and constraining their decision-making.

11. The use of an additional control group that would not receive any information (e.g., introductory lecture) would help in explaining the differential effect of individual treatment components.

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# APPENDIX A — CASE REPORTS

Some general comments deserve attention before reading the individual case reports. Firstly, a particular "reason for initiating exercise" may not appear under "goalsetting" simply because the individual did not consider it a deliberately stated goal. On the other side, certain aspects may repeatedly appear. For example, an expected benefit of exercise adherence may have been stated in the decision-balance sheet, and this presumed benefit may also have taken on the role of a specific, observable, and measurable goal (e.g., weight loss). Secondly, the counseling intervention was process-oriented which resulted in possible changes in intention-forming attitudes and beliefs. For example, weight control may have been initially an anticipated outcome and led to stating an exercise goal, but as a consequence of a successful behavior modification it may have taken on the role of behavior reinforcement. Lastly, not all aspects of the counseling intervention (e. g.,, goal-setting, self-monitoring, etc.) were of equal importance to all subjects. Thus, differential emphasis is placed on the various components in the different case reports.

Subject A1

Subject A1 (61) lived on a farm all her life until one year ago when her husband retired from farming, and they moved into a single family house in Leduc.

Exercise history. When reflecting on her exposure to exercise as a child, Subject A1 felt it was very limited compared to the opportunities of today's children. She did not, however, regret growing up when she did because she believes that the extensive opportunities available today place unnecessary pressures on young people.

The only physical activities Subject A1 engaged in as a child were walking, because it was the main means of transportation, and softball and skating, which she did for fun, when the farm chores were finished, "In those days, .. it was entertainment, we did it for fun." "If you had the time you did it [play games, skate, etc.] if not .. you didn't." None of the recreational activities were organized.

In her adult years, Subject A1 did not engage in sport activities as she found child raising and farm duties too physically demanding and tiring.

Reasons for initiating exercise. Subject A1 volunteered to be a part of the study because she wanted to improve her current physical condition (which she felt was extremely bad), to lose some weight, to feel better, and to meet people. She was also convinced that if she became physically active she could remain independent for as long as possible.

Goal-setting. Subject A1 stated a specific goal by betting twenty dollars with her son that she would lose five pounds by Christmas. She was more concerned about reducing her weight than winning this bet which was simply an additional incentive.

Decision-balance sheet. In the recent past, Subject A1 thought that she had insufficient discretionary time to devote to exercise. She noticed that when she considered the advantages of exercise, lack of time was really no reason for abstinence. She also noticed an interdependent relationship between the expected gains for herself (e. g.,, weight loss and feeling good) and the potential gains for people important to her. The positive affect of exercise was likely to result in her becoming a happier person and one whom others would enjoy more.

Self-monitoring. Recording her daily activity involvement had a very positive effect on Subject A1's awareness of her physical activity behavior, which in turn triggered an increase in her actual activity. She found that keeping the diary motivated her to be

physically active by reminiding her but it also reinforced her for doing it by increasing her awareness of her accomplishments.

Attribution of success / failure. Subject A1 attributed the successes she enjoyed to her predisposition towards exercise, her willingness to try, and her belief in succeeding. Her only "failures" were when she had to slow down her exercise routine due to illness, which she felt was something she had no control over. Even when sick she continued to exercise at a reduced level.

Writing a contract. This aspect did not play a role in Subject A1's progress.

Social support system. A definite advantage for Subject A1 was that she quickly developed a very strong social support system. It consisted of her family, who encouraged her with respect to her activities and goals, and her neighbours, who regularly invited her to join them for walks. During the early phase of her exercise involvement with her neighbours, Subject A1 commented, "This walk was a bit too far to start out on, but I had to follow my neighbours". Later, after walking got easier, Subject A1 noted "Going with the girls is really helpful."

Self-reinforcement. Subject A1's greatest source of reinforcement was the actual realization of some of her goals. Although she did not lose any weight, she was pleased to notice a change in her body composition. She "toned up" considerably which became evident when she was able to buy slacks a size smaller than usual. Over the weeks, she also experienced improvements in personal energy and flexibility; and was flattered by compliments given to her by family and friends. All this helped her begin to enjoy exercising on her own as well as with others and contributed to the development of a very positive outlook on exercise. The positive experience led to her planning to start an aquasize class in the spring.

Relapse prevention. Subject A1 anticipated having difficulty adhering to her exercise regimen over the Christmas holidays due to familial distractions. She was, however, confident that she would return to her newly acquired exercise behavior after the season was over, particularly, if her neighbour ladies had the same plans.

Progress of physical activity involvement. A considerable increase in exercise involvement is noticeable when Subject A1's involvement prior to the study (see **R** in Figure A.1) is compared to her engagement throughout the study period. She quickly reached a peak in her activity behavior and maintained it until the termination of the study. Subject A1 exercised even when she reported being sick, although on those days she omitted outdoor walking which resulted in a slightly reduced physical activity level.

Evaluation of the adherence counseling program's contribution to physical activity involvement. The change in Subject A1's physical activity involvement occurred immediately after attending the introductory lecture. This was when she started monitoring her exercise but prior to the start of the counseling. Thus, the initation of Subject A1's increased exercise behavior cannot be attributed to the counseling. The long-term adherence, however, was at least partially a result of the counseling. This is supported by Subject A1's positive evaluation of the counseling and the effect it had on helping her to reach her goals.

Both conducive weather to exercise and the immediate presence of others who were also interested in exercise contributed to the initial increase in Subject A1's physical activity involvement. Although the potential effects of a social support system were not disussed in a counseling session until after it had occurred, it can be speculated that the counseling reinforced the maintenance of the relationship.

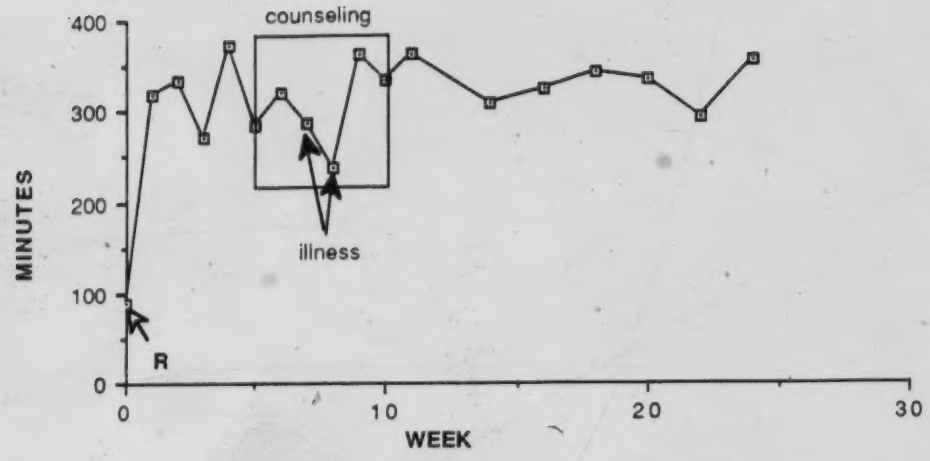


Figure A.1 Twenty-four week profile of physical activity involvement assessed through weekly diaries for Subject A1.

Note . R denotes the physical activity involvement during the week prior to the introductory lecture. It was assessed through a seven-day-recall questionnaire.

Subject A1 perceived that she had reached an optimal level in her physical activity involvement and for her there was no need for a further increase. Subsequently, the counseling objective was to enhance the consistency of the exercise behavior and the avoidance of a possible relapse to inactivity. Throughout the study period, Subject A1 maintained her increased level of physical activity involvement and lived up to her goal and intention of being physically active on a long-term basis.

Although Subject A1 attributed her exercise involvement to the physical benefits she was experiencing, she perceived the counseling and its individual components as helpful and supportive to her achievements. It was concluded that a significant part of her extended adherence can be attributed to the counseling.

Subject A2

Subject A2 (60) had recently moved from Edmonton into a new house in a retirement area at the outskirts of Leduc. Together with her husband who had just retired Subject A2 tried to adjust to a new environment.

Exercise history. Subject A2 grew up and lived most of her life in Edmonton. As a teenager she was physically very active and participated in competitive sports as a member of school teams. She was also involved in figure skating and baseball but on a recreational basis. Looking back, she regretted her limited opportunities for engaging in different sports because of financial reasons and societal norms (e.g., girls did not play soccer or hockey).

Physical activity was a part of Subject A2's lifestyle in which she enjoyed the fun of the various activities and the opportunity of socializing with friends. She needed to modify her active lifestyle when she entered the work force and again when she raised her children. Despite trying her best, she was unsuccessful in her attempt to remain physically active. Five years ago, she quit an aerobics class because of physical stress induced discomfort. Currently, she participated in a weekly yoga class, and she and her husband danced regularly.

Reasons for initiating exercise. Subject A2 entered the program for health reasons. She hoped to influence positively her aging process by improving her cardiovascular fitness and strength. She also expected to be more relaxed and to feel better as was the case after participating in her yoga class, for example. Her ultimate goal was the adoption of a habitual home-based exercise schedule since there were not physical fitness classes for older adults, in Leduc.

Goal-setting. Subject A2's initial goal of daily exercise was based on her belief that she had to exercise daily and for considerable length to obtain health benefits. This intention had a negative effect in that Subject A2 became discouraged and blamed herself for not exercising because she did not have sufficient time to exercise.

Decision-balance sheet. Subject A2 was certain that the advantages of regular exercise involvement outweighed the disadvantages, and consequently supported her decision to be physically active for health (i.e., both physical and mental health) reasons.

Self-monitoring. Particularly in the beginning, Subject A2 had difficulties in using her diary as a means of monitoring her exercise behavior. She perceived an external monitoring (e.g., through a fitness class instructor or through companions in an exercise class) as more effective than her own which she could easily brake. The keeping of a diary did not help her to learn how to substitute or modify her activity behavior when for example she attended a convention or babysat her grandchild. The positive aspect of the self-monitoring was that it increased her knowledge of her actual activity behavior which she eventually used in scheduling successfully her home-based exercises. Nevertheless she was convinced that her compliance would have been better in a monitored exercise class.

Attribution of success / failure. Subject A2 set unreasonably high goals which were too difficult to obtain and resulted in blaming herself for not meeting her expectations. During the course of the counseling, her self-attributions changed in accordance with the goal-setting and were more positive and success oriented.

Writing a contract. This aspect did not play a role in Subject A2's progress.

Social support system. Subject A2 received significant social support from her husband who encouraged and helped her in being active. He danced regularly (i.e., round and square dancing) with Subject A2 and provided her company in her walking and stretching endeavours, later in the program. Subject A2 felt very fortunate to receive such active encouragement and support. However, differing exercise predispositions resulted sometimes in disagreement, when they exercised together. Subject A2 exercised for health benefits, for enjoyment, and for the opportunity to socialize. Her husband, on the other side, exercised mainly for achievement.

Self-reinforcement. Noticing success in her attempt to become a consistent exerciser reinforced Subject A2's behavioral intention. She adopted an early morning ritual for her stretching exercises and was pleased with her accomplishment of stretching almost daily. She also reinforced her compliance behavior by experiencing positive physical (i.e., increased physical fitness) and emotional (i.e., improved well-being) changes which she attributed to her involvement.

Relapse prevention. Subject A2 expected lesser exercise opportunities during the Christmas season because of family commitments. Though, she was certain to return to her exercise behavior because of her positive attitude towards exercise, the recognition of

her previous success, and her husband's support. Thus, she did not plan any other measures to circumvent an inactivity relapse.

Progress of physical activity involvement. Subject A2 reported involvement in three different activities, yoga, square and round dancing, and walking, in the initial seven-day recall assessment (see **R** in Figure A.2). By the end of the program, she had also been involved in stretching exercises, riding a stationary bicycle, swimming, skating, and Tai Chi. Subject A2 recorded the highest weekly involvement when she and her husband danced (e.g., dance seminar). She was ill and was not allowed to participate in any vigorous physical activities during late January and early February. At the end of February, Subject A2 was unable to do any outdoor walking because of poor road conditions.

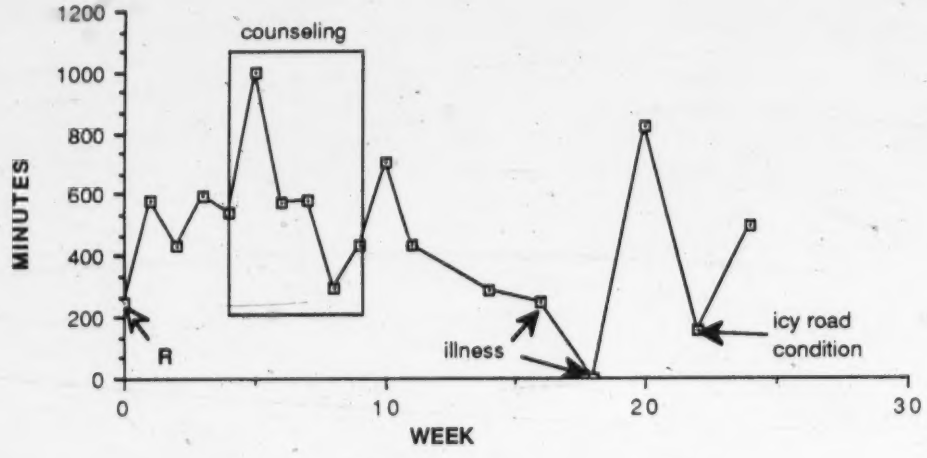


Figure A.2 Twenty-four week profile of physical activity involvement assessed through weekly diaries for Subject A2.

Note . R denotes the physical activity involvement during the week prior to the introductory lecture. It was assessed through a seven-day-recall questionnaire.

Evaluation of the adherence counseling program's contribution to physical activity involvement. Subject A2's physical activity involvement increased immediately after the introductory lecture and with the start of the self-monitoring (see **R** in Figure A.2). Following this increase, several positive and negative peaks are noticeable and are attributed to more intensive dancing (i.e., attending dance seminars) or uncontrollable events (i.e., illness or weather). The counseling may have had an effect on Subject A2's exercise maintenance but not on her exercise adoption, since the increase happened before the counseling took place. She already relied on her husband's social support at the onset of the study. However, as she confirmed, the counseling provided her with the information in how to use this support effectively. The counseling also helped Subject A2 to redefine her initial exercise goals which had left her discouraged after not meeting her expectations. Since she reported greater satisfaction in her approach to exercise, at a later stage in the program, it may be assumed that this attempt was successful.

The individual counseling did not contribute to the initiation of a more frequent and longer exercise behavior, but it does appear that the counseling had a positive effect on Subject A2's acceptance of her exercise behavior.

Subject A3

Subject A3 (60) had just retired, two years after her husband. Both Subject A3 and her husband had minor heart attacks and were classified as high risk individuals: both did not quit smoking until last winter, both had high blood cholesterol, and both had limited exposure to regular physical activity during the previous forty years.

Exercise history. Subject A3 perceived herself being physically quite active during her youth when she skated, cycled and played ball, "because it was the thing to do". She enjoyed most sports, although she was neither good nor successful, and particularly not in sports that demanded hand-eye coordintation such as tennis and golf. Her positive feelings were primarily triggered by socializing opportunities. "We went to the rink to meet the boys .. and girls, I guess." Subject A3 believed that she had sufficient opportunities to get involved in sport activities during her youth. Though, she regretted that she did not learn to swim until she was fifty years of age.

Raising children and then starting a professional career were synonymous with insufficient time for exercise. Just once Subject A3 joined a yoga class but did not return for the subsequent term. Her only physical activity prior to retirement was walking back and forth from work. Since then she had registered for an aquasize class which she intended to start shortly.

Reasons for initiating exercise. Subject A3 provided three reasons for her intention to exercise. First, she wanted to get out of the house to have some fun and to socialize with others. Second, she felt compelled to work actively on her physical health as she realized that she had some cardiac risk factors. Third, she felt young enough to work on her physical appearance by losing weight and toning her muscles.

Goal-setting. Subject A3 did not have a specific goal other than to develop into an exerciser who was independent from exercise classes since there were none for her age. She found this to be a reasonable goal which was difficult to accomplish because she experienced home-based exercises to be a chore. Losing weight was perceived to be an inevitable consequence as long as she would stay physically active on a regular basis. Thus, her goal of regular exercise remained throughout the program, and even after experiencing physical benefits.

Decision-balance sheet. Subject A3 anticipated being stimulated by her exercise outings, and she hoped that her positive mood would influence accordingly the relationship with her husband. She was convinced that exercise was a great opportunity to have some time away from her husband, particularly since they were not used to being together at home all day long, every day. "You can't be on somebody's back, all the time."

Self-monitoring. Subject A3 believed that the recording of her activities increased her awareness, however, she questioned whether or not it had an effect because she scheduled her activities for specified days and times without having to keep a diary for reminding and motivational purposes.

Attribution of success / failure. Subject A3 attributed gains in physical and mental well-being to her regular exercise involvement.

Writing a contract. This aspect did not play a role in Subject A3's progress.

Social support system. She perceived her husband to be very supportive of her actions, for example, he encouraged her to go bowling and to join the aquasize class. Later

in the program, he even joined her home-based stretching exercises which Subject A3 appreciated the most because of her difficulties in motivating herself to exercise at home. She also found her children to be supportive of her exercise involvement by giving her encouraging comments and noticing her accomplishment (e.g., weight loss). The participants in the aquasize class and the bowlers were also a social support group as they shared the same commitment.

Self-reinforcement. Subject A3 attributed physical changes to be a result of her previous compliance to her exercise intention, and perceived the changes as a motivational aid to continue. She experienced improvements in strength, flexibility, and walking ability. Moreover, she lost weight.

Relapse prevention. From her own experience in trying to quit smoking, Subject A3 was quite aware of the possibility of a relapse. With respect to exercise, she noticed that even a week of total inactivity did not have a similar effect as in smoking. It was no problem to return to exercise after a time of imposed inactivity, for example, caused by acute illness of her mother-in-law and her subsequent death. This experience left Subject A3 with the belief that she had not to worry about a serious relapse. However, in planning for a more conducive exercise environment, Subject A3 bought a stationary bicycle to foster her independence from both weather conditions and exercise group, at the end of the study.

Progress of physical activity involvement. Subject A3's initial seven-day recall (see **R** in Figure A.3) summarized the walking which was her only activity prior to the program. After recovering from a cold in October, she started bowling and an aquasize class and gradually added home-based stretching exercises. Bad weather forced Subject A3 to reduce her walking just before her mother-in-law was hospitalized and then passed away. Frequent hospital visits and later funeral arrangements left Subject A3 with little discretionary time for exercise. Together with her husband she went on a two-week vacation during which they walked a lot but without recording it.

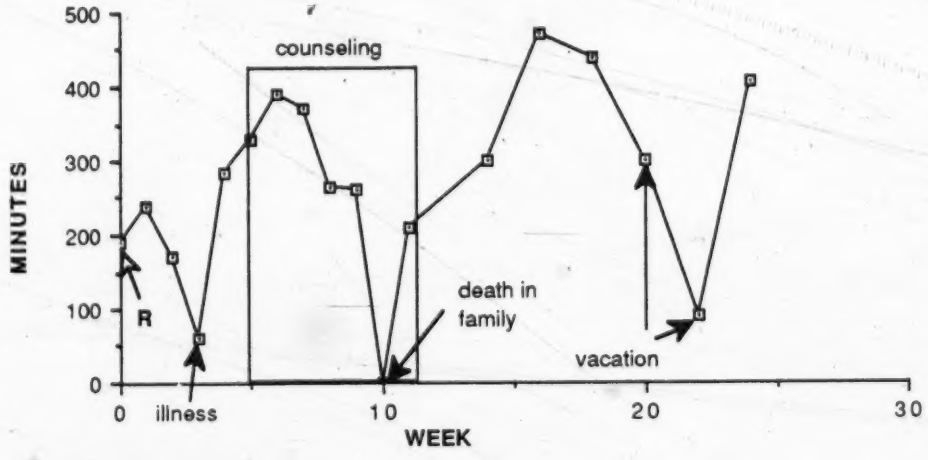


Figure A.3 Twenty-four week profile of physical activity involvement assessed through weekly diaries for Subject A3.
Note . R denotes the physical activity involvement during the week prior to the introductory lecture. It was assessed through a seven-day-recall questionnaire.

Evaluation of the adherence counseling program's contribution to physical activity involvement. Subject A3's exercise involvement did not change immediately after the introductory lecture and the start of the self-monitoring (Figure A.3). Her increasing exercise involvement just prior and during the early phase of the counseling must be attributed to her decision to start an aquasize class and to go bowling. Both decisions were made independently from the counseling, but may have been triggered by keeping the diary as it increased Subject A3's awareness of her activity level. She was very independent regarding her approach to exercise, and it appeared as if the counseling did not assist her decision-making process. She did indicate, however, that the counseling was helpful in confirming her exercise decisions, in increasing her awareness of her exercise involvement, and in motivating her to comply and be patient to wait for the benefits to accrue. As it turned out, the single greatest reinforcer to her adherence process was that Subject A3 eventually experienced the anticipated changes.

Subject A4

Subject A4 (66) grew up in rural Alberta but spent the greater part of her life in Leduc where she lived together with her husband in a single family house. They took care of house and property, which meant considerable yard work in the summer and snow removal activities in the winter.

Exercise history. Subject A4 used to be physically very active but her activity involvement had declined considerably and particularly during the previous five years which she believed was due to her laziness. As a youngster, she was active because she enjoyed the activity and she enjoyed the company of others; she did not exercise because she was talented, in fact, she never competed in any sports. Despite her current physical inactivity, she believed that her exercise correlates of socializing and fun have survived the decades.

Several years ago, Subject A4 participated in a yoga class, but she did not return for a second term because she was not fond of the activity. In recent past, her range of physical activity was occaisional walking and season-related outdoor activities (e.g., yard work, snow removal).

Reasons for initiating exercise. Subject A4's reasons for wanting to increase her level of physical activity involvement were to maintain her level of physical fitness, to stay healthy and active, and to generally feel good, physically and mentally.

Goal-setting. Subject A4's goals were to strengthen and tone up her muscles and to lose weight. During the course of the program she added the goal of socializing with friends as a motivational objective.

Decision-balance sheet. Subject A4 assumed that the advantages of exercise would outnumber the disadvantages, but she was unable to specify which those were, "It's more than just the physical .. it's feeling better, overall." She expected to improve her well-being which in turn would have a positive influence on her marital relationship.

Self-monitoring. Subject A4 started to increase her walking with the monitoring of her own physical activity involvment. "The diary makes you quite aware of your doing." Though she believed to be less active again once she did not have to submit the diaries. "You certainly have us ladies going these days. .. I guess when this all is over [the counseling and the keeping and submitting of weekly diaries] , I'll probably walk less .. maybe three or four times a week .. still it'll be more than what I used to do." The self-monitoring was effective in that it reminded her of her commitment; a more rigid scheduling

or controlling through monitoring was unnecessary because Subject A4 exercised when she or her companions felt like it.

Attribution of success / failure. This aspect did not play a role in Subject A4's progress.

Writing a contract. This aspect did not play a role in Subject A4's progress.

Social support system. Subject A4 received social support from her husband and from her neighbour ladies. Her husband encouraged her stretching and walking although he was unable to accompany her. Her neighbours were supportive in a more direct way by inviting Subject A4 to join them. "My neighbours .. if I didn't have them, I probably would not walk as much as I do." Although Subject A4 had a well-functioning support system, she hoped to encourage even more people (e.g., family members, friends) to accompany her on walks.

Subject A4 also favoured an organized fitness class for seniors to ensure her long-term commitment to physical activities. This was in aggreement with her preference to exercise with others.

Self-reinforcement. Subject A4's continued exercise involvement was reinforced by experiencing an improved well-being, which, in fact, excluded noticeable physical changes.

Relapse prevention. This aspect did not play a role in Subject A4's progress.

Progress of physical activity involvement. With the onset of the study, Subject A4 started to walk and to stretch regularly. In week 5 and week 22 she experienced a decline in her physical activity involvement which was attributed to babysitting for her daughter, for several days. Subject A4 felt that environmental conditions were responsible for a lower level of involvement in the last week of November. She also had only sporadic time for exercise when she was away on holidays in February.

Evaluation of the adherence counseling program's contribution to physical activity involvement. A significant increase in exercise involvement is noticeable when comparing Subject A4's initial seven-day recall value (see **R** in Figure A.4) to the subsequent weekly diary values. In agreement with Subject A4's self-evaluation, the increase must be attributed to an increased exercise awareness through self-monitoring and the immediate presence of a social support system existing of her husband and her neighbours. The counseling did obviously not affect the adoption of the exercise behavior. It may be assumed, however, that it, too, had a positive effect on Subject A4's exercise adherence process. With the start of the counseling an additional but smaller increase can be noticed which is interrupted only at times when external demands required a reduction (i.e., poor environmental conditions, being on holidays, and babysitting).

Subject A4 received her greatest source of reinforcement from her neighbour ladies who acted as a social support group. It is a mere speculation to estimate the influence of the counseling on the maintenance of the social support group since this connection was already in place. Based on Subject A4's perception the counseling was effective in helping her to increase her awareness concerning exercise goals and in recognizing exercise alternatives. In conclusion, Subject A4 was a self-determined exerciser who had already made effective use of a social support system in complying with her exercise decision. Although it is impossible to assess the degree to which counseling contributed to modifying Subject A4's behavior, it is important to recognize Subject A4's opinion that it was helpful.

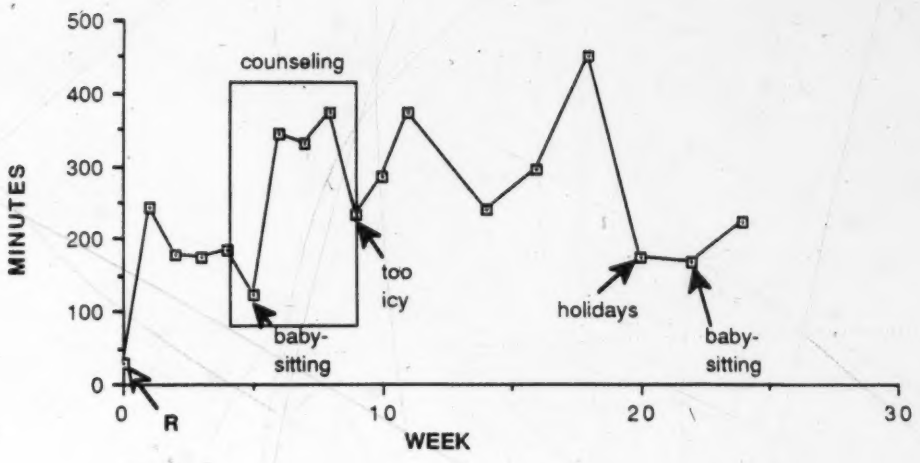


Figure A.4 Twenty-four week profile of physical activity involvement assessed through weekly diaries for Subject A4.

Note . R denotes the physical activity involvement during the week prior to the introductory lecture. It was assessed through a seven-day-recall questionnaire.

Subject A5

Subject A5 (60) grew up in rural Alberta and moved together with her husband to Leduc, in her mid-twenties. She did not have any occupational and recreational opportunities in her home town, something she regretted.

Exercise history. Subject A5's early exercise exposure was limited to walking and participating in common seasonal activities such as playing softball and skating. She always enjoyed what she did but in retrospect she was saddened by not having had more opportunities to try out other activities. For Subject A5 having fun was more important than winning.

She reduced her recreational activity involvement as she started a clerical career and raised the children. She did not increase her involvement, however, after retiring two years ago.

Reasons for initiating exercise. Subject A5 justified her intention to increase her exercise level with preventive health care motives. "For health reasons .. it's the topic." More specifically, she hoped to benefit in the areas of cardiovascular response efficiency, strength, flexibility, and weight control. Subject A5 also hoped to motivate her husband to increase his exercise involvement because after suffering from a stroke he had yet to follow the medical advice of incorporating more aerobic activities in his lifestyle.

Goal-setting. Subject A5's specific goal was to lose weight by increasing her caloric expenditure while decreasing her caloric intake. However, she admitted that it was much easier to be physically more active than to eat less or to eat differently; and yet, she lost weight and also experienced a change in her body composition.

Decision-balance sheet. Subject A5 did not believe that there were any disadvantages for herself or anybody else and thus exercise was reasonably justified. She

expected to experience mainly physical benefits resulting from regular exercise behavior. Though, she also anticipated to feel better.

Self-monitoring. The self-monitoring had a tremendous effect on Subject A5's exercise involvement in that it served as a reminder of her exercise decision. The keeping of a diary helped her to get started, and motivated her to comply with it.

Attribution of success / failure. By comparing her current activitiy involvement with her previous one Subject A5 noticed a remarkable difference in her exercise behavior. She was proud of her accomplishments and felt that she had reached some of her goals. "I think I had my best week, and I'm very proud of myself. .. I think we walked every day, and I also did my stretching exercises .. almost every day." Although Subject A5 believed herself to be responsible for her own actions, which included both successful and unsuccessful attempts regarding exercise adherence, she was also convinced that not every event was controllable. "Next week will be a problem. We're going to Reno. .. We're going with a group of people from Calgary .. on a bus. So that will be the problem." External factors (e.g., bus trip) were sometimes justifiable sources of interference. "I was upset that I couldn't go on Sunday; we had company."

Writing a contract. This aspect did not play a role in Subject A5's progress.

Social support system. Subject A5 benefitted from a very encouraging support group consisting of her husband and neighbour friends. Independently, they invited and accompanied her walking. Subject A5 enjoyed walking because of the exercise effect and the opportunity to socialize. Stretching, on the other side, was not as easily incorporated into her exercise regimen because it was done as a solitary activity on her own without an encouraging social support group. It took Subject A5 several weeks to successfully integrate stretching into her exercise routine.

Self-reinforcement. Subject A5 reinforced her exercise activity by interpreting physical changes as rewards of her activity compliance. She also found reassurance in comments from important others. For example, her sister commented that she [Azura] had lost weight. (She lost seven pounds during the counseling.)

Relapse prevention. Subject A5 planned to join an aquasize class in the spring as an appropriate alternative to walking and as a prospective means to avoid boredom and a possible relapse to a more sedentary lifestyle.

Progress of physical activity involvement. Subject A5's initial seven-day recall revealed a single 25 minute walk prior to the start of the program (see **R** in Figure A.5). Her subsequent weekly diaries depicted a nearly daily walking pattern to which stretching and strengthening exercises were added gradually. Subject A5 was unable to exercise as she went on a bus-tour to Reno in the last week of November. From there she returned with a cold which stopped her initiative from Thursday until Wednesday of the following week. She also felt restricted in her choice to exercise when her daughter asked her to babysit for a couple of days in March.

Evaluation of the adherence counseling program's contribution to physical activity involvement. Subject A5's exercise involvement depicts a significant increase immediately following the introductory lecture and the start of the self-monitoring. She perceived the keeping of a diary and submitting the records as very effective in reminding her to exercise regularly. In addition, however, she also experienced the support from her husband and neighbours. Thus, the determination of the effectiveness of these procedures is confounded in their simultaneous occurrence. The individual counseling did not have an

effect on the exercise adoption process. It may be assumed, however, that it influenced positively later stages of Subject A5's adherence process. With the beginning of the counseling an even higher level of involvement is noticeable which was interrupted only by seemingly uncontrollable events (e.g., vacation with a tour-group, illness). According to Subject A5 the counseling situation assisted her in finding and planning exercise alternatives (e.g., stretching, aquasize) and in reinforcing the value and utilization of a social support group.

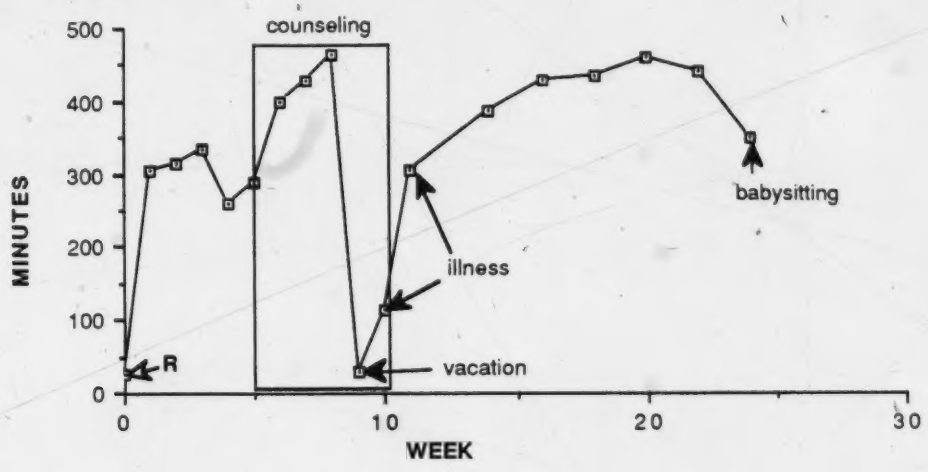


Figure A.5 Twenty-four week profile of physical activity involvement assessed through weekly diaries for Subject A5.

Note . R denotes the physical activity involvement during the week prior to the introductory lecture. It was assessed through a seven-day-recall questionnaire.

The individual counseling may not have had the initial effect on her exercise behavior, but both the client's perception and the quantitative data suggest that it contributed to the long-term adherence to a physically more active lifestyle.

Subject B1

Subject B1 (80) grew up on a farm near Leduc. She taught in country schools until she retired early to give 24-hour care to her husband starting in 1973. Subject B1's husband died five years ago, since then she has been living with her son and grandson for whom she cooks and cleans.

Exercise history. There was no opportunity to get involved in sport activities as they are known today. Nevertheless, she considered herself physically very active because of her commitment to help with farm chores on a daily basis. She also walked and not just because it was the means of transportation but also because of her liking for it. She never learned to skate or to swim.

Subject B1 got involved in three exercise classes after her husband's death. She quit aquasize because she disliked the water and Tai Chi because she had difficulties remembering the movements. She enjoyed aerobics for seniors but had to give it up because it was discontinued by the organizer.

Reasons for initiating exercise. Subject B1 volunteered currently to help residents in a seniors' nursing home. There, she noticed how many of her age peers depended on the help of others. Subject B1 became frightened of being confined to a wheelchair and having to rely on others for activites of daily living. She admitted that "things are going much slower these days. Even regular housework .. vacuuming .. is pretty hard work". Her urge for independence, thus, triggered her intention to exercise. Another motive for initiating exercise was her belief that by participating in an organized fitness class she would have an opportunity to socialize. Unfortunately, there was no aerobic fitness group for older adults in Leduc.

Goal-setting. Subject B1's goal was to maintain her current status of physical fitness, as she believed that her ability to improve was rather limited by her age. "I don't want to increase .. I'd like to maintain what I have .. at the moment." She had arrived at this goal by comparing herself to age peers in a nursing home where she did some volunteer work. She noticed that she was still capable of walking uptown, getting groceries, doing all her housework, and dance (if there was a senior's dance) while most others were not.

Decision-balance sheet. Subject B1 anticipated a positive effect on her physical and mental well-being from regular exercise. She hoped for improvements in stamina and strength (e.g., when getting groceries); she also hoped to be happier and to have a better mood (e.g., particularly when dealing with her grandson). Subject B1 planned to reflect on her expectations and actual changes to reaffirm her decision of becoming physically more active. "I don't think there are any negatives .. at least none that I can think of. If there were I probably wouldn't do it."

Self-monitoring. Subject B1 believed that the recording of her physical activities did not affect her actual involvement. However, she said "it keeps you aware of what you do, and it also reminds you to do it".

Attribution of success / failure. Subject B1 explained that her inability to walk was caused by weather circumstances rather than her attitude. Her attribution of shortcomings to exercise to uncontrollable factors was consistent (e.g., weather, doctor appointment, family matter, etc.).

Writing a contract. This aspect did not play a role in Subject B1's progress.

Social support system. She received no active encouragement from family members or friends. Though they did not object , and her son even assembled and set up the stationary bicycle for her.

Self-reinforcement. Subject B1 reinforced her activities by being able to take care of her own business needs. Originally she scheduled her walks in accordance with motives such as shopping or a doctor's appointment. During the process of the study, she also planned to walk for exercise reasons; this decision was made deliberately. "I walk .. I try not to call the handibus."

Relapse prevention. Although Subject B1 enjoyed walking, she anticipated problems with the onset of severe winter weather. She, thus, planned and did revitalize her husband's stationary bicycle which had not been used for years.

Progress of physical activity involvement. Subject B1 tried to be physically active on a daily basis as she had to avoid longer exercise sessions because they might have been too exhausting. For example, she was unable to ride for more than ten minutes at a time.

Ice and snow negatively affected her overall exercise involvement during several weeks as Subject B1 was afraid of falling and braking her bones. In December, she felt overwhelmed by season-related activities, shopping and baking. At that time, Subject B1 also had a cold which forced her to stay in bed for several days. She visited family members for almost a week in February.

Evaluation of the adherence counseling program's contribution to physical activity involvement. Subject B1's initial seven-day recall (see **R** in Figure A.6) was minimally lower than her weekly averaged values for both pre-intervention period and intervention period. Thus, one may suggest that neither the introductory lecture, nor the keeping of the diary, nor the counseling had a positive effect on her physical activity involvement. This is not in agreement with Subject B1's questionnaire evaluation of either one self-monitoring or counseling. It might be speculated that the maintenance of some exercise involvement was a success considering the deteriorating weather conditions. A positive influence of the counseling is thus suggested on the basis that it assisted her in making exercise-related decisions when environmental conditions were opportune.

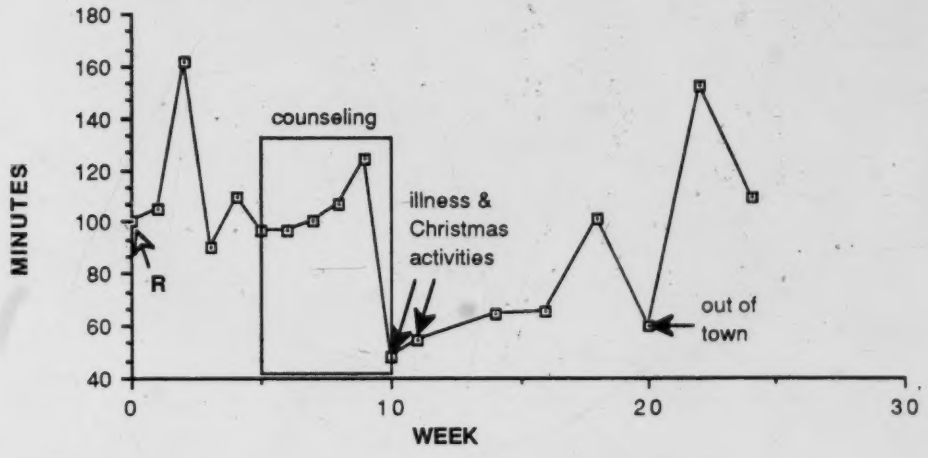


Figure A.6 Twenty-four week profile of physical activity involvement assessed through weekly diaries for Subject B1.

Note . R denotes the physical activity involvement during the week prior to the introductory lecture. It was assessed through a seven-day-recall questionnaire.

Subject B1 reached her goal of maintining her present status of health and physical fitness. Yet, it is difficult to evaluate objectively her exercise involvement because of unavailable norms for individuals of this age. The fact that she did not increase her physical activity involvement when compared to the pre-study value may be attributed to her advanced age. Her level of involvement may represent an upper value of exercise capacity for a healthy eighty year old adult.

The counseling contributed successfully to Subject B1's exercise behavior by assisting her in making activity-related decisions concerning relapse prevention (e.g., revitalizing stationary bicycle) and self-reinforcement (feeling of accomplishment through walks). The counseling did not improve, however, her initiative to substitute other activities for walking when weather conditions were not permitting. Based on Subject

B1's opinion, one may also expect that she would have been more active if a fitness class for older adults had been available.

Subject B2

Subject B2 (69) grew up in a small town in Alberta. After retiring, she got involved with interest groups which resulted in many unstructured and unorganized days and subsequently in a lack of time for regular physical activities. Currently most pressing was Subject B2's work on a toastmaster certification which demanded an unforeseen time commitment.

Exercise history. Subject B2 was physically very active during her childhood. She played softball and basketball on school-teams, she competed in track and field events, and she skated. While she enjoyed both competition and challenge she thought of socializing only as a by-product of exercise, in those days.

Subject B2's lifestyle changed drastically after she got married and had children. She did not engage in any regular physical activities for many years. When she was nearly 60 years of age, she started to exercise, but with no success. Once she quit a fitness class because of an injury; and at another time, the activity class was discontinued by the organizer. She reported a lack of self-motivation to start exercise on her own. Although Subject B2 was aware of the possible benefits of regular exercise involvement, her exercise behavior was only marginally affected by her knowledge.

Reasons for initiating exercise. Health represented the main motive that led Subject B2 to initiate exercise. This was in sharp contrast to her former activity-related predisposition in which competition and challenge were prominent motives. She complained about both her physical appearance and her physical fitness and she hoped to improve both by becoming a regular exerciser. "I'd like to stay mobile. .. And I'd like to reduce my weight .. but mainly I'd like to get more fit."

Goal-setting. Subject B2's goal was to improve her physical health by increasing her level of physical fitness and losing some weight. During the program, she also set a specific goal of exercising at least ninety minutes per week. She accomplished this goal and also her goal of reactivating her stationary bicycle which she kept stored in the basement for many years.

Decision-balance sheet. Her decision to start the program was based on the hope to relieve stress, to reduce occaisional depression, and to increase her physical fitness while losing weight. She did not associate anything negative with her exercise involvement, either for herself or for others.

Self-monitoring. Subject B2 believed that her activity involvement benefitted from committing herself to participate, to record the activities, and to submit them on a weekly basis to someone. At times, she was very dissatisfied and discouraged by the way she managed her life. She used to have a structured day, but after she retired she stopped keeping a schedule, and "I've got no time; there are too many things happening. When I still worked my days were organized, now they aren't .. That's terrible." Although the task of completing weekly diaries did not represent an organized exercise setting, as she had hoped for, it affected the structuring of her physical activity involvement.

Attribution of success / failure. This aspect did not play a role in Subject B2's progress.

Writing a contract. This aspect did not play a role in Subject B2's progress.

Social support system. Subject B2 did not receive any social support from her husband or her family. "We [she and her husband] don't affect each other too much." She knew that her children hoped that she would stay physically fit and mentally alert, but they did not actively encourage her. Similarly, her friends and associates were not interested in exercise and subsequently did not care about her desire. "I'm a group person .. if there was something going in a group, I'm certain I would do it, but doing it myself .. that is hard." Subject B2 felt sad about this careless attitude particularly since she was a social person who enjoyed "doing things" with others. At the same time, she could not imagine approaching others whom she did not associate with, for exercise reasons. She anticipated, however, becoming a long-term adherer in an exercise program if there was one.

Self-reinforcement. This aspect did not play a role in Subject B2's progress.

Relapse prevention. Subject B2 used the stationary bicycle as a means of avoiding a relapse to inactivity when the weather was not conducive for walking. With utilizing the bicycle, her exercise area became the living room rather than the outdoors which also helped her in scheduling. The riding of the bicycle became associated with watching television; something she would do anyway.

Progress of physical activity involvement. Subject B2's only physical activity prior to the program (see **R** in Figure A.7) was walking. During the counseling she added stretching and riding of a stationary bicycle and swimming in the new year. Subject B2 attended a three-day conference in the fifth week which prevented her from exercising. She started to swim occaisionally in the new year.

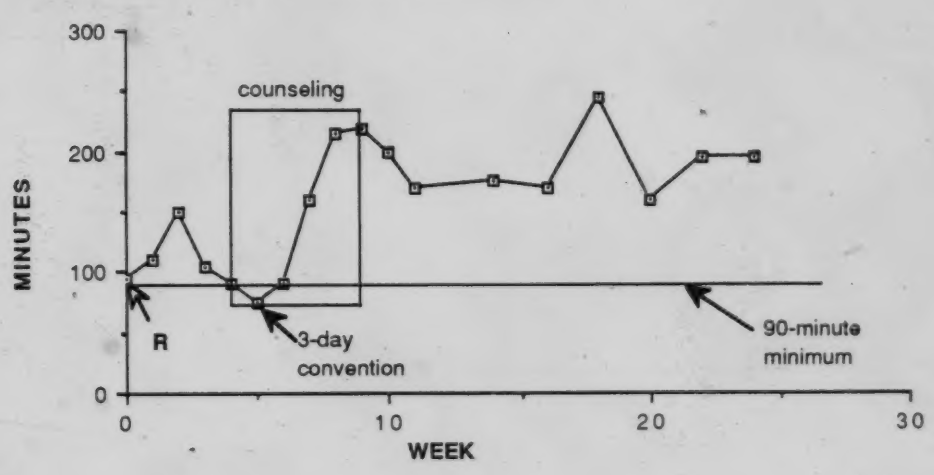


Figure A.7 Twenty-four week profile of physical activity involvement assessed through weekly diaries for Subject B2.

Note . R denotes the physical activity involvement during the week prior to the introductory lecture. It was assessed through a seven-day-recall questionnaire.

Evaluation of the adherence counseling program's contribution to physical activity involvement. Subject B2's physical activity involvement increased following the introductory lecture and the start of the self-monitoring, and the simultaneous presence of a sunny and warm autumn. The following decline may be attributed to colder weather, missing external stimulation (i.e., the novalty of keeping a diary had worn off), and an increased demand from her involvment in a toastmaster certification program.

The weekly interactions with Subject B2 were helpful for defining exercise goals and exploring venues that could assist her in increasing her activity involvment. Evidence for that is given in her exercise trend, her widened activity spectrum, her consistent exercise behavior, and her overall positive evaluation of the counseling situation. For example, it is doubtful if Subject B2 would have utilized the stationary bicycle if it had not been for the counseling. She perceived the parallel scheduling of riding and watching television as helpful in reaching her activity goal. The counseling situation was also conducive to use Subject B2's belief in her ability to adhere to an organized activity program in committing her to home-based activities (i.e., riding a stationary bicycle, stretching, and walking). Subject B2 was helped by recognizing that the main difference between organized exercise and home-based exercise was the setting. Although she complied with this decision, perhaps her involvement would have been greater if there had been an organized fitness class for seniors.

Subject B3

Subject B3 (62, single) grew up on a farm in southern Alberta. In her twenties, she moved to Leduc where she taught until her retirement two years ago. She lived alone in a one-family house with a big garden, which she looked after.

Exercise history. Subject B3 had limited exposure to sport activities during her childhood. She believed that her sparse experience with physical activities made her very self-conscious and affected negatively her exercise-related self-image. She associated fun and socializing with seasonal activities (e.g., skating, softball) although she considered herself clumsy and untalented. She did not regret growing up with limited exercise opportunities when she compared her unstructured and unorganized exercise involvement with the regimented activity schedule of today's children.

Work, family, and interest group commitments demanded a lower level of physical activity involvement for the greater part of her life. Though she started to golf when she was still teaching, and to bowl shortly after retiring. Both activities provided her with the opportunity to socialize which was a motivating factor "I used to like team activities when I was younger; today, it's more individual activities that I like. But I also like to be with others. I can do much better when others are around."

Reasons for initiating exercise. Playing golf and taking care of a big garden were sufficient sources of exercise for maintaining her level of fitness and mood in the summer; contrastingly, complete inactivity adversely affected her physical responsiveness and morale in the winter. Subject B3, thus, intended to maintain her summer fitness level and even hoped to improve as she considered physical fitness a major contributor to her state of well-being and overall health. "Walking isn't always fun, but it's good for you."

Goal-setting. In the beginning, Subject B3 set a specific goal of walking and stretching three to four times a week. She did not anticipate any problems in adhering to this goal for as long as the weather was conducive for walking, which meant golfing in Subject B3's terminology.

Decision-balance sheet. Subject B3 expected to experience health benefits and opportunities for socializing, which together would contribute to an improvement of her

well-being. Based on these anticipated results, she approved her recent actions regarding a physically more active lifestyle. She considered the approval of her exercise intention from others superfluous because of her marital status.

Subject B3 was aware of the consequence of her decision to exercise regularly. She would have less time for reading and other social activities, but then, she believed that she had sufficient discrectionary time as a retiree.

Self-monitoring. Subject B3 was convinced that monitoring her activities and submitting her record to somebody helped her in reaching her goal to be physically more active. "I don't like empty spaces. .. It has made me watch what I do .. and that I do it." She contemplated continuing the self-monitoring by keeping her own exercise record on a calendar after the termination of the program. Subject B3 assumed that the registration in an organized fitness class would have a similar effect as submitting weekly diaries. Under those circumstances, she would monitor herself not to miss classes and consequently become a regular exerciser.

Attribution of success / failure. Subject B3 perceived herself to be responsible for adhering to her decision to be physically more active. Though she also acknowledged the existence of uncontrollable conditions that justified temporary inactivity, for example, attending a convention. "I knew that I wouldn't do a lot while I was at the convention."

Writing a contract. This aspect did not play a role in Subject B3's progress.

Social support system. Although friends and immediate family approved Subject B3's exercise behavior she did not have a social support system that actively encouraged her to be physically active. She was convinced, however, that such a support system was of benefit, and particularly to her benefit, since she had difficulties starting exercise on her own. For example, Subject B3 believed that the pure presence of others (e.g., golf party, bowling team) was sufficiently supportive for complying with her intention. Thus, she hoped to participate eventually in an organized fitness class for seniors.

Self-reinforcement. Subject B3 perceived the improvements in riding her stationary bicycle as rewarding and encouraging for further compliance. Not only had she increased the distance from three miles to five miles, but it also felt much easier. Her exercise behavior was reinforced by her perception of the physical benefits which were evident in completing activities of daily living with greater ease and being more energetic.

Relapse prevention. Subject B3 decided on riding her stationary bicycle as a subsititute for walking which scared her after falling on an ice patch. From her previous experience with riding the bicycle, she expected it to be boring, and she would not have been surprised if she quit. However, by scheduling it along her television viewing, the bicycle riding became pleasant. She was satisfied by having avoided a possible trap of inactivity.

Subject B3 believed that the threat of a relapse to inactivity was not realistic after committing herself to the program, considering substitute activities, and reflecting on the advantages and disadvantages of regular exercise.

Progress of physical activity involvement. Subject B3's initial seven-day recall (see **R** in Figure A.8) and the first two diaries show effects of her golfing activities. The following weeks were more representative of her exercise involvement, she said. During the ninth week of the program, Subject B3 attended a convention in Calgary which curtailed her exercise involvement. Subject B3 substituted snow shovelling for several of her exercise sessions. She felt unable to exercise in addition to shovelling snow. She

recorded the snow removal as a 'heavy' but shorter activity. Subject B3 went on a holiday which affected her last assessment in March.

Evaluation of the adherence counseling program's contribution to physical activity involvement. Subject B3's initial seven-day-recall (see **R** in Figure A.8) and the following two weekly diaries depicted a high level of involvement in physical activities. As reported by Subject B3, however, she reassured her involvement was not affected by the introductory lecture nor by monitoring her own exercise, instead it was affected by a seasonal activity, golf. With the beginning of the counseling, Subject B3's exercise involvement increased gradually for the longest part of the study. According to Subject B3, this positive trend of her long-term adherence may be attributed to the counseling. Considering her worries about her poor exercise commitment during the previous winter makes this trend even more remarkable.

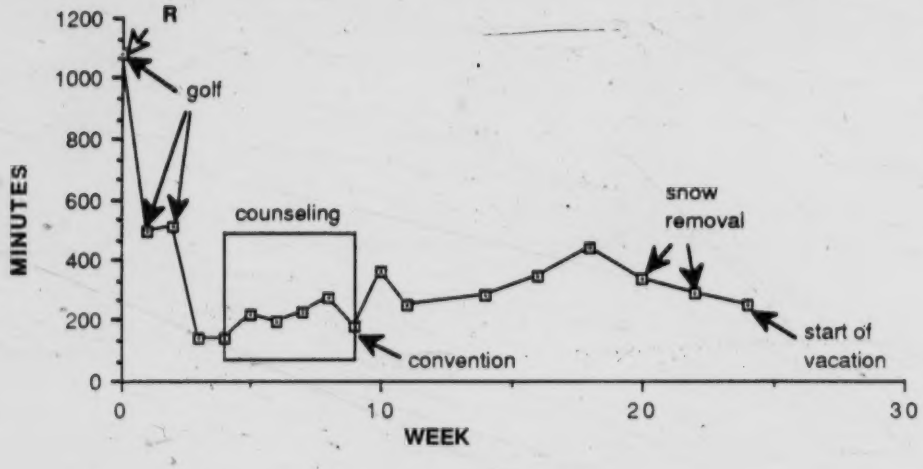


Figure A.8 Twenty-four week profile of physical activity involvement assessed through weekly diaries for Subject B3.

Note . R denotes the physical activity involvement during the week prior to the introductory lecture. It was assessed through a seven-day-recall questionnaire.

Subject B3's recognition of exercise alternatives such as riding a stationary bicycle or following a stretching program for older adults on television may be evaluated as positive contributions of the counseling. After parallel scheduling of home-based exercises and watching television she learned that a television-caused distraction helped her immensely to adhere to her exercise goal.

Subject B3 also perceived the self-monitoring as an effective way to increase her awareness of established exercise opportunities and to maintain her exercise adherence. Most rewarding, however, was the accomplishment of her anticipated goal to increase her physical fitness. The speculation of an existing causal relationship between counseling and achievement of exercise benefits must be considered with extreme caution, though.

Subject B4

Subject B4 (69) grew up on a farm; shewas expected to do physically very demanding work since she did not have any brothers. After her husband retired from

farming eighteen years ago they moved to Leduc where Subject B4 worked several part-time jobs (e.g., Kentucky Fried Chicken, Safeway etc.) until she retired in 1982.

Exercise history. Subject B4's exposure to sport-related physical activities during her school years was limited to marching drills, some calisthenics and occaisonally some ball games. She did not engage in any sport activities after she married. Farmwork was her only way of being physically active. She attributed her increase in weight (140 lbs to 200 lbs.) to a reduction in her physical activity involvement since she did not change her dietary habits after she moved from the farm to the city.

Reasons for initiating exercise. Subject B4 was afraid of negative health consequences resulting from overweight and physical inactivity. She believed that she should exercise to increase her physical fitness and even more importantly to lose weight which was necessary to maintain her current physical health. Her current exercise involvement was limited to bowling and floor curling which she enjoyed for the social component. "I love bowling and floor curling. I used to do it up to four times a week; but it was getting too expensive." Her reasoning for exercise manifested the conviction that it was a means to an end which allowed eating without regrets.

Goal-setting. Subject B4's primary goal was very specific, she hoped to lose weight, 40 pounds, which of course was somewhat unrealistic. By the end of the program, she noticed that her ulitimate goal was still far away although she had lost weight. Subject B4's secondary goal was to improve her physical fitness so that activities of daily living could be performed with greater ease.

Decision-balance sheet. Subject B4 entertained a one-sided belief about exercise in that she could not imagine any disadvantages associated with her decision to exercise regularly. She did not anticipate any difficulties in adhering to her decision.

Self-monitoring. Subject B4 perceived the self-monitoring as a helpful aid to increase her awareness concerning her activity behavior. Recording her exercise behavior on a daily basis left her committed to being physically active since she was embarrassed to submit an empty diary. Despite the positive effect that the self-monitoring had, she could not imagine continuing the recording after the termination of the program.

Attribution of success / failure. This aspect did not play a role in Subject B4's progress.

Writing a contract. This aspect did not play a role in Subject B4's progress.

Social support system. Subject B4's sister-in-law remarked that she must have lost weight, "That made me feel good." and it provided her with the confidence of being successful. She received supportive encouragement from her friends and her family, except for her husband who did not care about her and her exercise.

Self-reinforcement. The partial accomplishment of her goal, to lose weight, served as the single greatest reinforcer. In addition, Subject B4 felt encouraged by associating greater ease in activities of daily living (e.g., shovelling snow) with her effort of being physically more active.

Relapse prevention. Subject B4 used to engage in bowling, floor curling, and some walking. Triggered by a fall on an ice patch and subsequent doubts about the appropriateness of walking as a winter activity, Subject B4 planned to initiate home-based

calisthenics and riding of a stationary bicycle to avoid possible setbacks regarding her activity involvement during the cold weather period.

Progress of physical activity involvement

Subject B4 was actively involved in bowling and floor curling prior to the study (see **R** in Figure A.9). This involvement added up to approximately seven hours a week. Over the course of the intervention, she initiated home-based calisthenics and riding of a stationary bicycle as a substitute for her exercise walking.

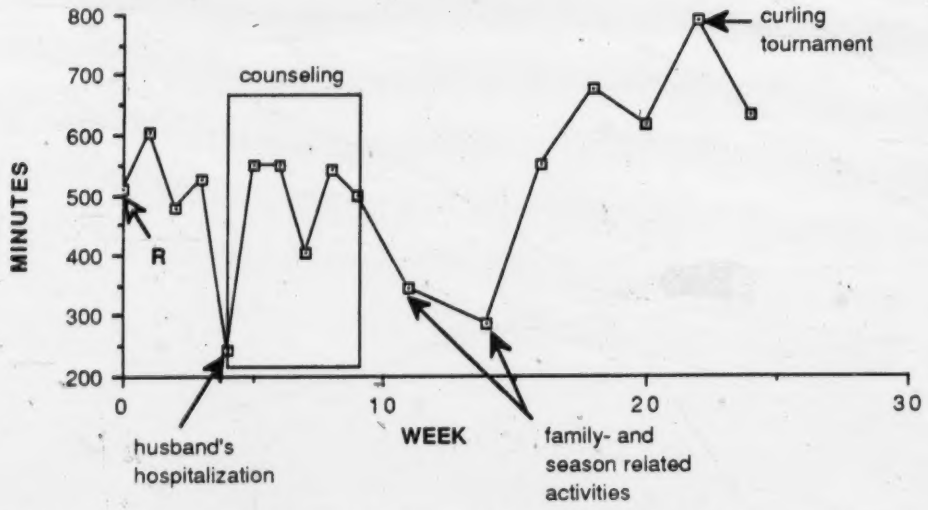


Figure A.9 Twenty-four week profile of physical activity involvement assessed through weekly diaries for Subject B4.

Note . R denotes the physical activity involvement during the week prior to the introductory lecture. It was assessed through a seven-day-recall questionnaire.

Subject B4's husband was hospitalized in the fourth week. She accompanied him to Edmonton where she spent several days which had a negative effect on her activity involvement. Family- and season-related events were reasons for similarly negative effects prior to Christmas and in the first week of the new year.

Evaluation of the adherence counseling program's contribution to physical activity involvement. Subject B4's physical activity involvement during the program did not change significantly when compared to her previous involvement (see **R** in Figure A.9). It would appear that neither the introductory lecture nor the self-monitoring nor the counseling seem to have affected her total involvement. However, it might be observed that she adopted new activities to avoid a reduction in her exercise behavior which was expected to happen at the time of colder and icier weather. Consequently, it may be concluded that the counseling positively assisted her in widening her exercise alternatives. Moreover, Subject B4 perceived that the counseling was also helpful in increasing her awareness regarding the scheduling of her exercise. The greatest source of motivation was without any doubt Subject B4's partial accomplishment of her primary goal and the recognition of the same by others. The counseling cannot be held responsible for Subject B4's weight reduction, though it most likely assisted in acquiring the necessary behavior for that to happen.

Subject B5

Subject B5 (60) cared for her husband Jim who had been diagnosed as having Alzheimer's disease, three years ago. The current stage of his disease forced Subject B5 to stay at home almost continuously. But despite feeling restricted in her opportunity to be active, she hoped to take care of her husband for as long as she could tolerate the pressure.

Exercise history. Subject B5 reflected with saddness on her activity-related past. She resented not having had the opportunties that children have today as her exercise exposure was limited to unorganized seasonal activities such as skating and swimming and of course walking and biking which were means of transportation.

She enjoyed the active entertainment of "exercise and play" by herself and with others. Her attitude towards being active remained the same over the years, although she had to give up on most of her physical and social activities because of family and work commitments and lately her husband's health.

Reasons for initiating exercise

Subject B5 intended to use the exercise as an outlet for the pressure caused by her living arrangement and 'caring' commitment. She also hoped to increase her physical fitness and appearance while still being able to provide sufficient care for her husband. "I want to be active for as long as I can. I'm an active person by nature .. what I do at the moment is not me." - "I wanna do it not just for the physical part .. it's an escape .. I need to leave my prison .. it's mainly distraction, and yes, I want to be more fit again."

Goal-setting. This aspect did not play a role in Subject B5's progress.

Decision-balance sheet. Subject B5 was convinced that the advantages of regular exercise outweighed the disadvantages by a significant margin, but she acknowledged that disadvantages existed for her. For example, she was uncertain whether or not she could maintain her independence through regular physical activity involvement, because of her caring commitment to her husband. Subject B5 was also uncertain about her family's reaction to her exercise plans, although she anticipated positive changes, which would also affect her family responsibilities, including the caregiving for her husband. Her final decision to start exercising was based on her expectancy to be happier, to be more approachable, and to be less moody.

Self-monitoring. Subject B5 believed that she did not benefit from monitoring her activities. Whenever she had sufficient time she tried to be active regardless of keeping a diary. The diary did not serve as a reminder, but instead it was perceived as a nuisance sometimes.

Attribution of success / failure. This aspect did not play a role in Subject B5's progress.

Writing a contract. This aspect did not play a role in Subject B5's progress.

Social support system. This aspect did not play a role in Subject B5's progress.

Self-reinforcement. This aspect did not play a role in Subject B5's progress.

Relapse prevention. Subject B5's intention to be physically active suffered under her decision to complete some house renovations before Christmas. To avoid a relapse to physical inactivity, she developed both long-term and short-term plans. First, she intended

to join an aquasize class in the spring knowing that she had insufficient discretionary time in the fall. Second, she purchased a windtrainer which enabled her to utilize her outdoor bicycle indoors and allowed her to exercise at home, at her own convenience. This way she hoped to serve both her husband's caring demand and her desire to exercise.

Progress of physical activity involvement

Subject B5's initial recordings showed the effect of her involvement with house renovations (Figure A.10). Although not considered exercise, within the context of the current study, taking off wall-paper, painting, and wall-papering were time consuming and tiring activities. The diary for week seven got lost in the mail. Subject B5 complained about lacking sufficient time to exercise because of various family commitments prior to Christmas. Her second last assessment was affected by a cold and bed rest for several days. Although the following diary showed already an upswing, she was still recuperating from the cold.

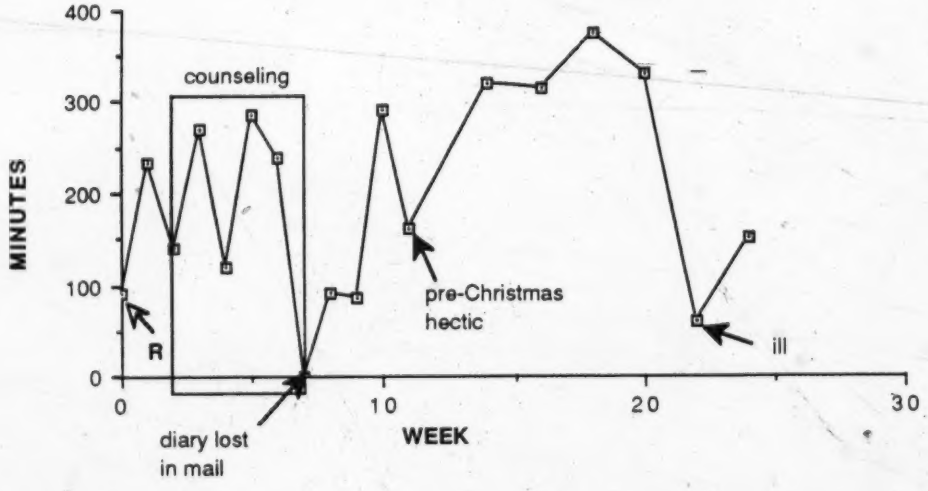


Figure A.10 Twenty-four week profile of physical activity involvement assessed through weekly diaries for Subject B5.

Note . R denotes the physical activity involvement during the week prior to the introductory lecture. It was assessed through a seven-day-recall questionnaire.

Evaluation of the adherence counseling program's contribution to physical activity involvement. Subject B5's physical activity involvement increased immediately after the introductory lecture and with the keeping of weekly diaries (Figure A.10). However, this increase did not stabilize over the following weeks, on the contrary, Subject B5's activity involvement was characterized by a series of high and low peaks until Christmas. This suggests that neither the lecture nor the monitoring had a lasting long-term effect regarding Subject B5's exercise adherence pattern. The same may not necessarily be true for the evaluation of the counseling. Here, one may speculate that a higher involvement suggests an indirect influence from the intervention, particularly after Subject B5's completion of the home renovations in the second part of the study. These considerations are in agreement with Subject B5's perception of the counseling and the self-monitoring. She believed that the intervention helped her in finding a home-based exercise alternative, riding her bicycle, which prevented an inactivity relapse. At the same time, she was convinced of the ineffectiveness of the monitoring.

Subject C1

Subject C1 (60 and married) described her previous exercise commitment as focusing on her efforts to maintain her house and garden. She perceived her physical health and physical fitness to be average compared to others her age. At the same time, she believed that she had a poor commitment to regular physical activity over the previous five years.

Exercise history. Subject C1 had spent her youth and early adulthood in Ireland where her exercise exposure was limited to the mandatory activities of the school curriculum. She did not engage in any of the variety of extracurricular sport activities. Walking was her main activity, both prior to and after becoming a nurse. She usually was too tired from work and household chores, to become involved in any other regular exercise activities.

Reasons for initiating exercise. As a nurse Subject C1 had exposure to preventive health care information which convinced her that she ought to adopt a more physically active lifestyle. Weight control was her major concern. "I need to do something .. today .. if I don't want to suffer later. I need to lose weight .. I also need to become more fit .. I huff and puff .. after five steps." Although Subject C1 correctly assumed that her level of aerobic fitness would be much better if she were not so heavy, it was embarrassment over her excessive weight that held her back from exercising. She, thus, chose to exercise by herself before commiting herself to an exercise group so she could increase both physical fitness and self-confidence.

Goal-setting. Subject C1 wanted to lose an unspecified amount of weight.

Decision-balance sheet. Subject C1 was well aware of the detriments of physical inactivity but she was also unable to motivate herself to be active. "I find myself looking for excuses .. I avoid the challenge .. or I think I'm gonna do it at a different time .. but after pushing it off, I still don't do it." Subject C1 relied on media information to anticipate possible benefits from exercise since she had only unpleasant memories of her exposure to exercise as a student.

Self-monitoring. For Subject C1, a major problem was scheduling a time for exercise. Although she preferred the structure and the regularity of an exercise class, she was too self-conscious to join an exercise class because of her weight. The keeping of the physical activity diary improved both her attitude and actual level of involvement, particularly, after she set aside a predetermined thirty minute slot in the morning for walking. She recognized that by monitoring her exercise the regularity of her exercise behavior improved. Moreover, it reminded her to exercise after missing a day or even two. "It's not time consuming; actually, it is quite good since it increases my awareness towards the exercise. .. Things are going easier, the walking with my husband and the Tai-Chi [she followed a television program]." In the beginning of the program, the self-monitoring also had an adverse effect when she pressured herself to walk every day, which resulted in a depressed mood when she had to miss.

Attribution of success / failure. This aspect did not play a role in Subject C1's progress.

Writing a contract. This aspect did not play a role in Subject C1's progress.

Social support system. Subject C1 received moral support from her husband in her attempt to increase her physical activity involvement. Subject C1, however, appreciated the support only concerning the walking when he accompanied her after work. She was not enthused over him watching her performing Tai Chi. This became more of a problem after he got laid off at work and was at home continuously.

Self-reinforcement. Noticeable changes reinforced Subject C1's activity behavior. She felt better, mentally and physically, after a few weeks of increased aerobic activity. Walking and Tai Chi were relaxing exercises, which she found pleasurable. She also experienced being more energetic after an exercise bout. Moreover, Subject C1 had lost twelve pounds by the end of the counseling which she attributed to both an altered diet and an increased level of aerobic activity.

Relapse prevention. This aspect did not play a role in Subject C1's progress.

Progress of physical activity involvement. The seven day recall measure (see **R** in Figure A.11) was not representative of her usual activity pattern as it was effected by fall-related yard work, according to Subject C1. With the beginning of the study, she started to walk, mostly by herself until her husband got laid off just before Christmas. This incidence in combination with a hospitalization of her father-in-law put her under unexpected emotional stress. Both events caused a temporary reduction of her exercise involvement. Her activtiy involvement was relatively low in January because she was afraid of treacherous road conditions, and she disliked being watched by her husband when she did Tai Chi. Subject C1 did not provide any explanation for not exercising during the first week of March. In her last diary, she expressed the hope of becoming more consistent in her walking after buying a cockerspaniel.

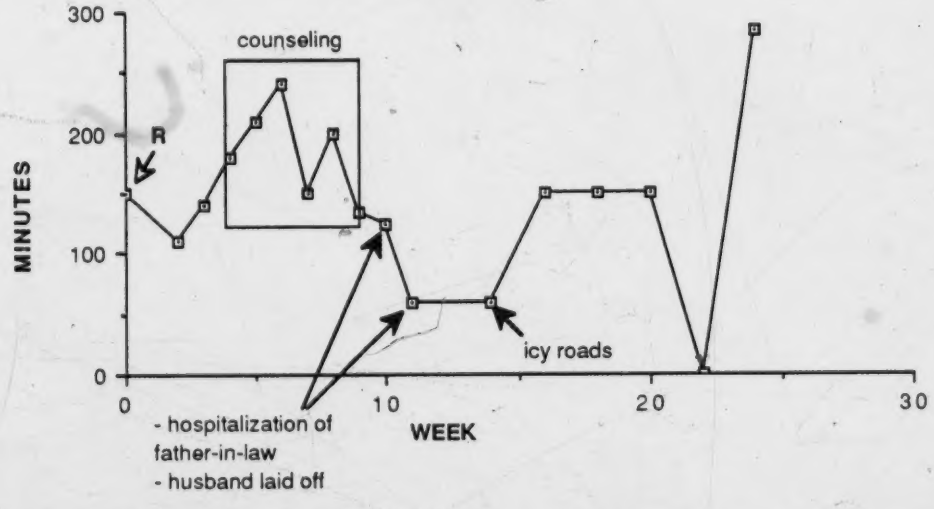


Figure A.11 Twenty-four week profile of physical activity involvement assessed through weekly diaries for Subject C1.

Note . R denotes the physical activity involvement during the week prior to the introductory lecture. It was assessed through a seven-day-recall questionnaire.

Evaluation of the adherence counseling program's contribution to physical activity involvement. Subject C1 was not always successful in adhering to her decision to be physically more active. Her exercise involvement changed during the counseling period without establishing a consistent pattern. In agreement with Subject C1's positive evaluation, it can be speculated that the counseling had a positive effect by increasing her awareness concerning the importance of monitoring and scheduling her activities. It did not accomplish, however, an increase in Subject C1's confidence to be able to exercise when there were external distractions or barriers. For example, the presence of her husband irritated her in doing Tai Chi or her father-in-law's hospitalization stopped her exercise involvement almost completely. At the same time, it may be considered a positive contribution of the counseling that Subject C1 was able to return to a physically more active lifestyle after these barriers had disappeared.

Subject C1 was easily affected by external events which lead to emotional distress, adversely affected her intention to exercise and resulted in not reaching her desired level of exercise consistency. Despite that, she was physically more active and believed that the counseling had a positive effect on reaching her goal of weight loss. Most likely the counseling helped Subject C1 to reaffirm her belief in the importance of regular exercise for her health, it contributed to the accomplishment of a goal, and it increased her awareness that she could be successful for as long as she committed herself to a schedule and avoided or removed external pressure.

Subject C2

Subject C2 (69) grew up in a small town in rural Saskatchewan but has lived in many places in Canada since then. She was married for almost fifty years when her husband passed away in February. Seven years ago, Subject C2 was diagnosed as a diabetic who could control her condition through diet and exercise, but she had difficulties following the exercise guidelines.

Exercise history. Subject C2 was polio infected as a child and subsequently suffered a number of motor problems which she eventually overcame. She even learned to skate and to play ball games, but she never reached a level that enabled her to compete with her classmates. Subject C2's reasons for being active was to enjoy the company of others. With entering the labor force her exercise involvement ceased completely except for walking, which she did as an Avon salesperson. Two years ago, Subject C2 joined an aquasize class which she quit because of problems in adjusting to the class schedule due to her diabetes.

Reasons for initiating exercise. Subject C2 was aware that as a diabetic she had to exercise regularly to maintain her physical health. "I know I can control my sugar through exercise ... but I need the motivation to do it." Thus, physical health was her primary reason for initiating exercise. Her secondary reason was to improve her total well-being by losing weight and increasing cardiovascular fitness and strength.

Goal-setting. Subject C2's goal was to be physically active on a regular basis but independent from structured and organized fitness classes. She hoped to exercise at home when it was convenient and agreeable with her dietary patterns. Her specific goal was to exercise six times per week for approximately thirty minutes.

Decision-balance sheet. With her health condition in mind it was obvious that the benefits of regular exercise involvement would outnumber any drawbacks. She anticipated emotional benefits in addition to physical benefits. Both she and her husband were cognizant of the necessity for Subject C2 to exercise, and thus both approved of her

action.[6] Subject C2 expected to encounter motivational problems as a result of her lacking confidence. "I feel better .. all around .. after exercising, but it is hard to convince myself."

Self-monitoring. Subject C2 increased her awareness of her physical activity involvement by comparing her recordings to a pre-determined goal in which she hoped to exceed 180 minutes per week. For the future, she planned the utilization of an exercise diary in conjunction with her blood sugar log as a viable alternative for maintaining her exercise behavior on a long-term basis.

Attribution of success / failure. Subject C2 used to believe that she was responsible for her poor exercise commitment and attributed this to her misconception of "I must exercise for thirty minutes, every day". During the course of the program, Subject C2's exercise attitude changed and she noticed that she was successful and capable in mastering the exercise when she followed a gradual approach.

Writing a contract. Subject C2 attempted to reach her goal to be physically active regularly by committing herself to a written contract in which she collected a dollar every time she reached her daily goal of thirty minutes until she had saved enough money to treat herself for a facial.

Social support system. Subject C2's husband was the main source of social support. He encouraged her to be physically active and provided active assistance by driving her to shopping malls when the weather was not conducive for walking outdoors. Due to his own health problems he could not accompany her on walks, though.

Self-reinforcement. Positive changes in Subject C2's physical and emotional well-being were effective reinforcers and pointed in the direction of an extended compliance with her decision to be physically active.

Relapse prevention. Subject C2 was cognizant of her adherence problem. To avoid a relapse to inactivity, she planned to continue the self-monitoring, to make a public commitment to a friend, to utilize even more shopping malls for indoor walking, and to look for other exercise alternatives to avoid boredom.

Progress of physical activity involvement. Walking was Subject C2's only recorded activity in her initial seven-day recall assessment (see **R** in Figure A.12). During the course of the program, she started to ride her stationary bicycle and to do calisthenics.

Subject C2's exercise involvement stabilized at a predetermined weekly goal of 180 minutes/week after she had an exceptional week immediately after the start of the counseling. Subject C2's exercise involvement dropped suddenly as her husband got seriously sick and died in February. In her last diary, Subject C2 remarked that she did not have any discretionary time due to selling her house and moving into an apartement.

Evaluation of the adherence counseling program's contribution to physical activity involvement. When compared to Subject C2's initial seven-day recall (see **R** in Figure A.12) her physical activity involvement increased immediately after attending the introductory lecture and with the monitoring of her exercise behavior. In accordance with Subject C2's belief this change must be attributed to the self-monitoring procedure which increased her awareness of her exercise consistency, and demanded a public commitment by submitting the records. It must be expected that the week of peak performance was

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[6]Crystal lost her primary source of social support with her husband's death in February.

effected by the novalty of the first counseling session and very conducive weather conditions.

In agreement with Subject C2, several components of the counseling seemed to effect positively her long-term adherence process. First, by including a variety of activities, she avoided boredom, which used to prevent her from exercising, at times. Second, in determining a specific exercise goal (i.e., 180 minutes/week), she saw her daily progress in relation to her weekly goal. Third, by setting a specific goal, she was able to write a contract for her exercise commitment. Fourth, by noticing physical changes and feeling good at the same time, Subject C2 reinforced her action.

The negative trend in Subject C2's adherence process must be attributed to favourable weather in the fall, which resulted in a performance high, a predetermined goal in the early winter, which stabilized the performance, and an uncontrollable event in the later phase of the program, which triggered an excusable decline. Although the amount of exercising was quite variable it can be concluded that the counseling contributed positively to Subject C2's exercise involvement.

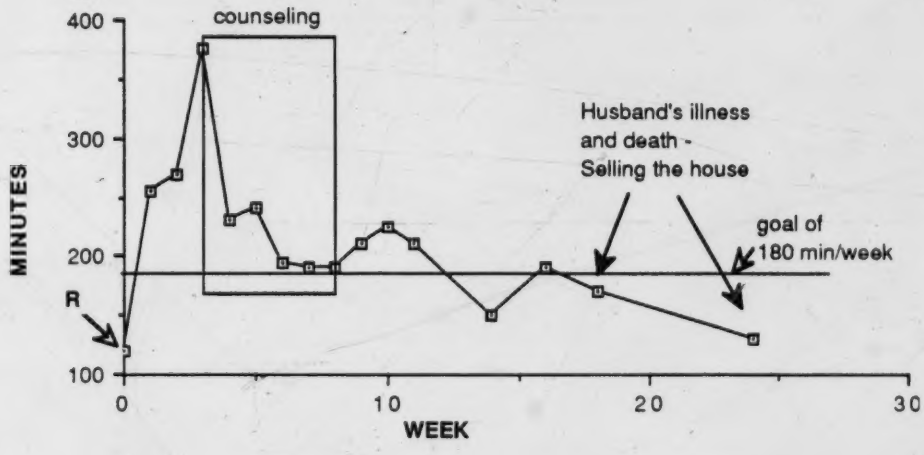



Figure A.12 Twenty-four week profile of physical activity involvement assessed through weekly diaries for Subject C2.

Note . R denotes the physical activity involvement during the week prior to the introductory lecture. It was assessed through a seven-day-recall questionnaire.

Subject D1

Subject D1 (61) spent her childhood and early adulthood in rural Saskatchewan before moving to Leduc. Despite frequent visits from her children and grandchildren she has been lonesome since her husband died a year ago.

Exercise history. In her early childhood days, Subject D1 had to learn "boy's stuff" to participate in games since she was the only girl in a class of nineteen students. But already then she developed weak ankles which reduced her physical activity involvement to walking and farm activities at home. She did not even learn to swim, on the contrary, she became paranoid of water the day she nearly drowned, at the age of nine. Although she never lost her fear of water, she hoped to adopt aquasize some day because she believed it was an excellent exercise for people with osteoarthrities.

Subject D1's semi-active lifestyle was affected negatively after entering the workforce, when raising children, and after undergoing several surgeries later in her life. Her increasing inactivity was superseded by a considerable increase in weight which she has fought unsuccessfully for several years.

Reasons for initiating exercise. Subject D1 believed that she was much too young to be confined to a wheelchair, but that this could happen easily because she experienced extreme stiffness in her joints when she did not move for some time. She was also frightened of exhausting herself because it, too, had a negative affect on her health. "I need to do it. .. It is a must if I want to stay mobile. .. I have osteoarthrities in my whole body. .. Walking is good for it, as long as I do it within limits."

Subject D1's reasons for initiating the program were to improve her physical fitness, to reduce her weight, and to affect positively her mood and well-being. "I want to be more fit. I put on my socks and I start puffing." She hoped that by exercising regularly she would be able to complete activities of daily living with greater ease and to cope better with stressful situations.

Goal-setting. Subject D1's specific goal was to walk seriously three times a week and to stretch and strengthen her muscles on the days between. She accepted that she had to restrict herself to a moderate level of involvement due to her physical limitations. She could not risk the chance of exhausting herself.

Decision-balance sheet. Subject D1 was certain that exercise would have a positive effect on many health-related aspects, which were dependent on each other, and which were all important. She believed that having a better attitude and being more sociable was a main benefit for individuals who interacted with her (e.g., family) and who were important to her. Subject D1 was convinced that sensible involvement in regular exercise was without negative consequences, while physical inactivity was detrimental to physical and mental well-being.

Self-monitoring. The self-monitoring increased her awarness of her activity involvement and she believed it was helpful, however, she questioned whether the benefit would continue after termination of the program. "It makes you think about what you do. And you don't skip as many times because you write it down."

Attribution of success / failure. Subject D1 felt responsible for the initiation of her exercise behavior. She also believed that certain motivational aides (e.g., submitting a diary, group setting, etc.) would be advantageous to the achievement of success. She perceived herself to be a pawn of her physical condition when she had to reduce her exercise involvement due to sickness.

Writing a contract. This aspect did not play a role in Subject D1's progress.

Social support system. This aspect did not play a role in Subject D1's progress.

Self-reinforcement. Subject D1 thrived on accomplishments and she expected to reinforce her exercise involvement by noticing anticipated results (e.g., weight loss, greater ease in completing activities of daily living). A deteriorating change of her physical health, however, prevented her from noticing any benefits. Her positive attitude towards exercise was reinforced only by her hope and belief of an eventual change for the better.

Relapse prevention. Subject D1 planned to substitute her exercise activities with other urgent activities such as raking leafs or shovelling snow to avoid physical inactivity. Her physical condition rather than her willingness to exercise was the cause of her

temporary inactivity. Subject D1 perceived this state as an uncontrollable event rather than a relapse to volitional inactivity. "The housework is at least as demanding as my workout [walking, stretching]. Actually, I'm more exhausted from doing this than from the walk. But if I sit on the couch all day, it is even worse. My bones stiffen up, and it takes even longer to get moving."

Progress of physical activity involvement. Subject D1 anticipated difficulties in maintaining a decent level of exercise involvement when snow and ice covered the streets. This expectation materialized, unfortunately. Subject D1 experienced a number of problems, though, during the process of the study.

Subject D1's physical activity involvment stayed relatively high for four weeks, in the beginning (see Figure A.13). An arthritic flare-up followed by lung congestion, caused by changing weather conditions, resulted in a considerable drop in her physical activity involvement as her doctor ordered bed rest for several days. In mid-December, Subject D1 suffered again from an arthritic flare-up and received physical therapy until the end of February.

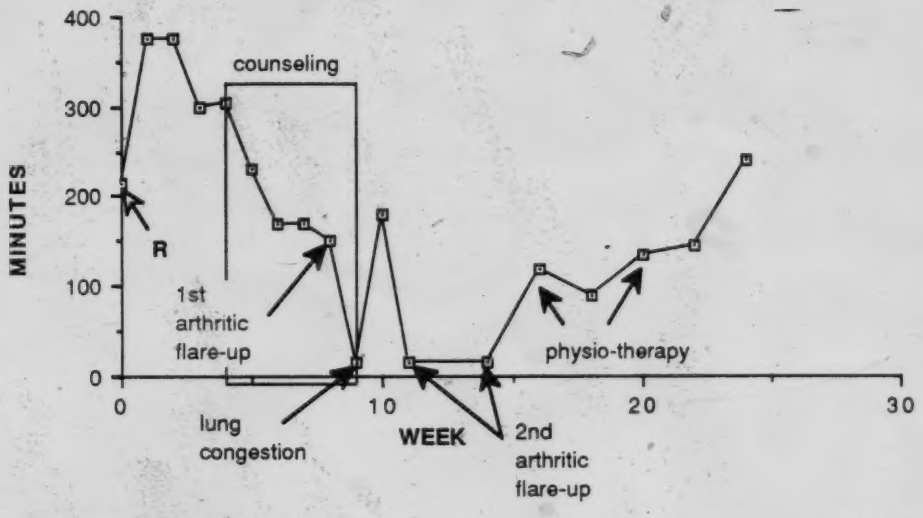



Figure A.13 Twenty-four week profile of physical activity involvement assessed through weekly diaries for Subject D1.

Note . R denotes the physical activity involvement during the week prior to the introductory lecture. It was assessed through a seven-day-recall questionnaire.

Evaluation of the adherence counseling program's contribution to physical activity involvement. Subject D1's physical activity involvement increased immediately after the introductory lecture, with the beginning of the self-monitoring, and before the counseling. Thus, the increase in exercise when compared to her involvement prior the program (see **R** in Figure A.13) cannot be attributed to the counseling. Subject D1's intention-behavior relationship can be described as "the mind was willing but the body refused". In other words, the option to exercise was no longer a volitional decision. The decline of her exercise behavior during the counseling period was interpreted as an effect of both a colder and icier environment and a deterioration of her health rather than an adverse effect of the counseling. This opinion is supported by Subject D1's positive evaluation of the counseling and her stated regret concerning having to reduce her exercise involvement due to her health. The trend of her activity involvement suggested that the counseling may have

had a positive long-term effect as Subject D1 resumed exercise in late Februray after recuperating from her second acute arthritic flare-up.

Subject D1's positive perception of the counseling demonstrated her receptiveness towards exercise adherence-related information and her development of reasonable and achievable goals. The counseling assisted her in planning activity alternatives (e.g., stretching, riding her stationary bicycle) for walking, depending on the weather.

Subject D2

Subject D2 (62) moved from a farm into an apartement in Leduc after her husband died, a year ago. She had not established a circle of friends since moving into the city, yet she was content and comfortable with her current living situation.

Exercise history. Like any farm girl that grew up in rural Alberta Subject D2 perceived herself being physically active by helping on the farm, skating for enjoyment, and walking. Retrospectively, she judged that other exercise opportunities were there for those who wanted them but that she was not too keen in physical endeavors apart from her regular chores. Her attitude towards exercise did not change during and after raising five children; on the contrary, she was reassured in her belief that daily activities provided a sufficient physical challenge. More recently, a heart condition and some joint calcification imposed constraints on her involvement in physically very demanding activities.

Reasons for initiating exercise. Subject D2 considered regular involvement in some kind of exercise a necessity to maintain her physical health and to retain her independence. She arrived at this conclusion after attending to information on exercise and health issues which acknowledged the interdependence of appropriate exercise, diet, and sleep. Since she did not always live accordingly, she hoped to acquire a regular exercise behavior to improve her level of physical fitness. The opportunity to socialize and to enjoy herself was of secondary importance. "It's good for me. .. It is a must. I don't like many of the activities, but I do them anyway because I know they are good for me."

Goal-setting. Subject D2's goal was to improve her physical fitness which she considered a stepping stone for maintaining health and social independence. At the onset of the study, she described her health as fair but not good and she believed that everything better was a positive contribution to her health. "I'm too young to be inactive."

Decision-balance sheet. Subject D2 started exercising only because she anticipated physical benefits to derive which would outweigh all disadvantages from participating, such as a lack of time for other recreational activities or spending money on an exercise program (registration fee for aquasize). "I am very aware of pros and cons before I do something; I think of everything." Because she was single, only she had to approve her decision to get involved, however, once she had committed herself she felt compelled to comply with the program until its termination.

Self-monitoring. Subject D2 perceived the monitoring of her own activities to be a successful means to keep her motivated to adhere to unstructured, home-based activities such as stretching and walking. She posted the diary in her apartment and expressed satisfaction whenever she made entries because she had done something for her own benefit. "I need the diary as a reminder and a motivator." She believed that the monitoring was advantageous to her compliance behavior, but she also believed that a similar effect would result from registering in a structured fitness class.

Attribution of success / failure. Subject D2 attributed both success and failure to her own doing. Initially, she believed that failure to stretch or to walk was a sign of

weakness and poor commitment to her decision which was made independently of weather or any other external conditions (e.g., dentist appointments, orthotics repair). After discussing the controllability of external events, she acknowledged that she was responsible for the effort to adhere while the actual behavior was also subject to influences removed from her control.

Writing a contract. This aspect did not play a role in Subject D2's progress.

Social support system. Subject D2 perceived social support irrelevant because she lived on her own, did not get involved with too many people, and did not expect nor want approval from others. Because she believed that her exercise involvement could only affect herself, she did not feel any outside pressure.

Self-reinforcement. Subject D2 experienced some physical improvements (e.g., increase in flexibility and strength) which she attributed to her compliance with the stretching exercises. Those changes reinforced her decision to make a contribution to her health by being physically active. Furthermore, she enjoyed her accomplishments in a learn to swim program (e.g., learned to float and to complete some strokes) and perceived that skill acquisition was gratifying and rewarding, even though she did not believe that they would contribute to her physical health.

Relapse prevention. This aspect did not play a role in Subject D2's progress.

Progress of physical activity involvement. Subject D2's initial recall estimated an exercise involvement of 210 minutes (see **R** in Figure A.14). At that time of the counseling she added to her walking stretching and aquasize for which she later substituted a learn-to-swim program (week 7). Dental appointments undermined her intention to attend the aquasize classes in week five. A virous infection which she carried home from a short trip to Mexico curtailed her exercise initiative at the end of the program. "Have done none as the Mexican Bug is still with me and due to weakness cannot do anything that requires effort."

Evaluation of the adherence counseling program's contribution to physical activity involvement. At first sight, Subject D2's physical activity involvement appears seemingly unaffected by the counseling. She reported, however, having gained more insight and awareness in to the positive effects of exercise and adherence fostering strategies. For Subject D2 to acknowledge that "failing" in her intention to be active is not always attributable to herself, may be considered an important contribution of the counseling. It is difficult to speculate on the differential effectiveness of counseling and self-monitoring because the counseling was necessary to discuss the importance of recognizing and acknowledging improvements and setting goals, while the self-monitoring was crucial in making the quantitative changes visible which she perceived as rewarding. According to Subject D2, the self-monitoring was a very effective means in motivating her to exercise. It is questionable, however, if she would have maintained her exercise pattern without discussing her progress.

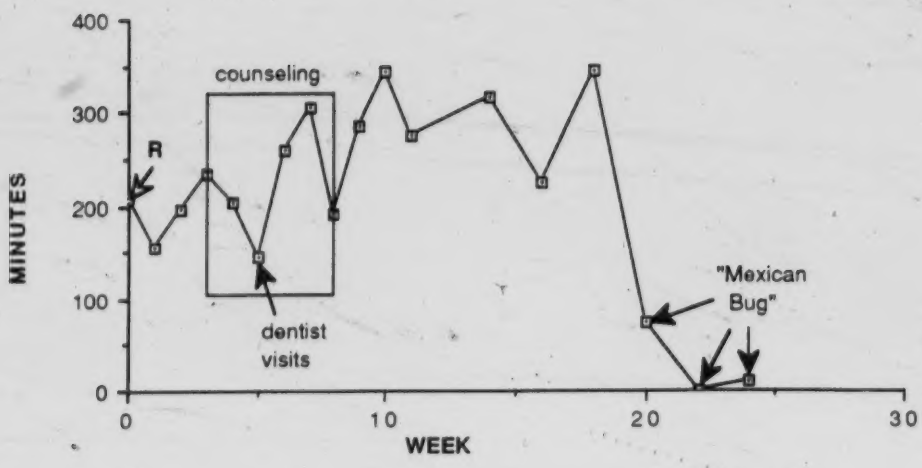



Figure A.14 Twenty-four week profile of physical activity involvement assessed through weekly diaries for Subject D2.

Note . R denotes the physical activity involvement during the week prior to the introductory lecture. It was assessed through a seven-day-recall questionnaire.

# APPENDIX B— PRE-STUDY QUESTIONNAIRE

# PHYSICAL ACTIVITY QUESTIONNAIRE

**Dept. of Physical Education and Sport Studies**
**University of Alberta**

Name _____
Address _____ City _____
Postal Code _____ Phone _____

Age _____ Marital status single ___
married ___
widowed ___
other ___

My overall health is ...

excellent 1 2 3 4 5 6 7 poor

---

In comparison to others of my age, I think that my health is ...

above average 1 2 3 4 5 6 7 below average

---

My overall level of fitness is ...

excellent 1 2 3 4 5 6 7 poor

---

In comparison to others my age, I think my level of fitness is ...

above average 1 2 3 4 5 6 7 below average

---

Five years ago, my level of fitness was ...

better than today 1 2 3 4 5 6 7 worse than today

---

My physical activity during the last week included the following:

| Day | ACTIVITY | FOR HOW LONG |
|---|---|---|
| Monday | | |
| Tuesday | | |
| Wednesday | | |
| Thursday | | |
| Friday | | |
| Saturday | | |
| Sunday | | |

If I compare my physical activity from last week to what I did five years ago, I would say that I am now ...

far more active 1 2 3 4 5 6 7 far less active

---

In the last five years, my personal commitment to regular physical activity has been ...

excellent 1 2 3 4 5 6 7 poor

---

I would like to be involved in regular physical activities...

definitely yes 1 2 3 4 5 6 7 definitely not

---

I am willing to try to increase my present physical activity involvement ...

definitely yes 1 2 3 4 5 6 7 definitely not

---

I think that counselling would help to increase my physical activity level...

definitely yes 1 2 3 4 5 6 7 definitely not

---

I think that keeping a diary about my physical activities would help to increase my physical activity level...

definitely yes 1 2 3 4 5 6 7 definitely not

---

I think that regularly receiving written information about physical activity and its benefits would help to increase my physical activity level...

| definitely yes | | | | | | definitely not |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

# APPENDIX C — POST-STUDY QUESTIONNAIRE

Dear

In September of 1989, you expressed an intention to increase your regular physical activity involvement. You then participated in a program designed to help you in doing this. The Canadian Fitness and Lifestyle Research Institute, which sponsored this program, would like to know if the program was of any help to you in increasing your physical activity involvement.

Please be very honest about how closely you followed instructions and your reactions to the program. The Canadian Fitness and Lifestyle Research Institute would like to know what worked for you and what did not. Your answers will enable us to improve the program.

To complete the questionnaire, please follow these guidelines:

1. Report in what kind of physical activities and for how long you were involved in the previous week (Monday, March 12, 1990 to Sunday, March 18, 1990).
2. Please read each statement very carefully.
3. State your opinion concerning the statements by circling **one** number which indicates either agreement or disagreement. For example,

This winter was very severe.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

if you strongly agree with this statement, you should circle a "1", if you strongly disaree , you should circle a "7", and if you have some mixed feelings about this statement, you should circle a "4".

**There is no right or wrong answer. There is only your opinion! In evaluating this program we rely on your cooperation by letting us know your opinion. The information will be kept confidential!** If you should have any further questions, please contact:

**Dr. Leonard M. Wankel, 492 - 5702.**

**Please, take your time and read each question very carefully. Thank you!**

NAME_____

My physical activity during the last week (March 12 - March 18) included the following:

| Day | ACTIVITY | FOR HOW LONG |
|---|---|---|
| Monday, March 12, | | |
| Tuesday, March 13 | | |
| Wednesday, March 14 | | |
| Thursday, March 15 | | |
| Friday, March 16 | | |
| Saturday, March 17 | | |
| Sunday, March 18 | | |

My overall health is ...

excellent 1 2 3 4 5 6 7 poor

My overall health prior to the start of the program (September, 1989) was ...

excellent 1 2 3 4 5 6 7 poor

In comparison to others of my age, I think my current health is ...

above average 1 2 3 4 5 6 7 below average

My overall level of fitness is ...

excellent 1 2 3 4 5 6 7 poor

My overall level of fitness prior to the start of the program (September, 1989) was ...

| excellent | | | | | | poor |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

In comparison to others my age, I think my current level of fitness is ...

| above average | | | | | | below average |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

If I compare my physical activity from last week to what I did prior to the start of the program (September, 1989), I would say that I am now ...

| far more active | | | | | | far less active |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**Please, complete the following questions with respect to <u>your</u> feelings about various aspects of the program.**

The program was effective in assisting me to increase my physical activity involvement.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Over the past six months (i.e. since the start of the program, September, 1989), I have gained confidence in my ability to be physically active.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I accomplished the goals which I had set concerning increasing my regular physical activity involvement.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I intend to have physical activities as a part of my lifestyle in the future.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I kept the physical activity diary as accurately as I could.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

The lecture titled BENEFITS FROM REGULAR EXERCISE helped me to reach my goal to increase my physical activity involvement.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Keeping a physical activity diary helped me to reach my goal to increase my physical activity involvement.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

The information pamphlet PHYSICAL ACTIVITY INVOLVEMENT helped me to reach my goal to increase my physical activity involvement.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

The counseling (i.e. the actual discussion sessions with the counselor) helped me to reach my goal to increase my physical activity involvement.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

To what extend did you use the information given in the lecture titled BENEFITS FROM REGULAR EXERCISE?

| not at all | | | | | | a great deal |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

To what extend did you use the information given in the information pamphlet PHYSICAL ACTIVITY INVOLVEMENT?

| not at all | | | | | | a great deal |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

To what extend did you use the information given in the counseling sessions?

| not at all | | | | | | a great deal |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Was the length of the counseling sessions about right?

| too short | | | about right | | | too long |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Was the number of counseling sessions about right?

| too short | | | about right | | | too long |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I felt uncomfortable during the sessions with the counselor.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

The counselor asked questions that were too personal.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

The counselor encouraged and supported my attempts to become physically more active.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I would have liked advice that was more specific on how to increase my physical activity involvement.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

The counselor did not care about me and my well-being.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

The counselor genuinely wanted to help me to increase my physical activity involvement.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I am confident that I will be physically active in the future.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I wanted to please the counselor during the program.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I tried to follow the advice of the counselor.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I would recommend this program to a friend.

| strongly agree | | | | | | strongly disagree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Do you have any recommendations, suggestions, or ideas for improving the counseling program so that it would be helpful to other people like yourself?

**Thank you very much for your help!**

**Use the stamped envelope to return the questionnaire.**

# APPENDIX D — PHYSICAL ACTIVITY DIARY

# DIARY OF YOUR PHYSICAL ACTIVITY INVOLVEMENT

**NAME** _____

| **INTENSITY RATING GUIDE** | LIGHT<br>slight change | MEDIUM<br>some perspiring, above normal breathing | HEAVY<br>heavy perspiration, heavy breathing |
|---|---|---|---|

| PHYSICAL ACTIVITY (name please) | TIME (be specific) | INTENSITY (circle one, see guide) |
|---|---|---|

Date: **Monday, October 2, 1989**

| | | | | | |
|---|---|---|---|---|---|
| A. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| B. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| C. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| D. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |

COMMENTS:

Date: **Tuesday, October 3, 1989**

| | | | | | |
|---|---|---|---|---|---|
| A. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| B. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| C. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| D. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |

COMMENTS:

Date: **Wednesday, October 4, 1989**

| | | | | | |
|---|---|---|---|---|---|
| A. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| B. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| C. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| D. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |

COMMENTS:

Date: **Thursday, October 5, 1989, 1990**

| | | | | | |
|---|---|---|---|---|---|
| A. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| B. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| C. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| D. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |

COMMENTS:

Date: **Friday, October 6, 1989**

| | | | | | |
|---|---|---|---|---|---|
| A. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| B. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| C. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| D. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |

COMMENTS:

Date: **Saturday, October 7, 1989**

| | | | | | |
|---|---|---|---|---|---|
| A. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| B. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| C. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| D. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |

COMMENTS:

Date: **Sunday, October 8, 1989**

| | | | | | |
|---|---|---|---|---|---|
| A. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| B. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| C. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |
| D. _____ | From ___ | To ___ | LIGHT | MEDIUM | HEAVY |

COMMENTS

**Problems? Please contact Jochen Bocksnick, 432-9369, any time.**

# APPENDIX E — PHSYICAL ACTIVITY READINESS QUESTIONNAIRE (PAR-Q)

**NAME**_____

MODIFIED PAR-Q
(Physical Activity Readiness Questionnaire)

PLEASE READ THE FOLLOWING QUESTIONS CAREFULLY AND CIRCLE "YES" OR "NO" AS IT APPLIES TO YOU. **RETURN AS SOON AS POSSIBLE!**

| | | |
|---|---|---|
| Has your doctor ever said you have heart trouble? | Yes | No |
| Do you suffer or have you ever suffered from discomfort or pain in the chest? | Yes | No |
| Do you often feel faint or have spells of dizziness? | Yes | No |
| Has a doctor ever said your blood pressure was too high? | Yes | No |
| Are you on any prescribed medication? | Yes | No |
| Have you ever had bone, joint, or muscle problems (e.g. arthritis) that might be aggravated by exercise? | Yes | No |
| Have you been in the hospital in the past six months? If so, please give the reason. _____ | Yes | No |
| Is there a good physical reason not mentioned here why you should not increase your physical activity involvement even if you wanted to? If so, please explain. _____ | Yes | No |

If you answered "yes" to any of the above questions, please consult with your physician before starting to increase your regular physical activity involvement.

# APPENDIX F — HANDOUTS #1 TO #6

Handout #1

# PHYSICAL ACTIVITY INVOLVEMENT

Your intention to play an active role in the maintenance of your physical health is great! You have considered physical activity involvement as a vital element to do so. Hopefully, your enthusiasm will let you be patient in waiting for the benefits to accrue from your regular physical activity involvement.

The following notes provide some ideas on how to plan your physical activity involvement. Remember, **you do it for yourself**. So, why should you not have fun when you are physically active? **Choose an activity you like**. In the talk "The Benefits of Regular Exercise for Older Adults" guidelines were presented for how much is considered necessary to maintain physical fitness (A minimum of 3 times per week, at a moderate intensity, for a duration of 20-30 minutes is recommended). However those are only guidelines. You need to determine your own involvement. You decide what you do, when you do it, for how long you do it, and at which intensity you do it. Your appreciation for being physically active will be influenced positively if you consider your previous physical activity history, your preference for certain activities, and your expected benefits from these activities.

**Goal-setting**

The realization that physical fitness is important to general health has led many people to increase their physical activity involvement. Improvement and maintenance of physical and mental health is the most commonly reported goal by older adults who begin an activity program.

We are able to influence our behavior by setting goals. The goals provide direction for actions. They provide targets we attempt to reach. Consider the following goal: the improvement of physical fitness. Unfortunately, "physical fitness" cannot be readily observed. It would be difficult to assess whether progress is being made in achieving this goal or not. It would be preferable to set more specific goals which can be readily measured in terms of observable behaviors. For example an endurance goal might be to walk three miles without stopping. A strength goal might be to lift a 20 pound weight with one hand. Goals are most effective when they are stated in a **specific context** and when they refer to a **concrete behavior**. Being able to observe the progress of an intended behavior will also effect the reaching of goals.

Goal-setting is a simple process. The individual states what shall be accomplished, the goal. If the goal is within reach the individual will try to achieve the goal directly. If the goal is not within reach, the individual will have to set intermediate goals. **Intermediate goals** represent a series of steps towards accomplishment of the main goal. For example, the goal is walking three miles without resting. If the individual is unable to walk three miles without resting, an intermediate goal should be set. Such an intermediate goal might be walking two miles. As time progresses, the individual will find out that through practice (you may call it training), walking three miles without interruption will be accomplished.

Realistic planning will lead to effective goals. The intention to become a millionaire might be valid, but the chances of this happening might be quite unrealistic. Consequently, this goal might not be a very effective motivator for goal-related actions.

Unless you are aware of your goal, you will not be able to say whether or not you have reached the goal. Goal-setting can be motivating and rewarding. It will motivate by giving your actions a direction (e.g. stretching exercises for the improvement of your flexibility). Goal-setting is rewarding by providing feedback on the achievement of intermediate and final goals. Too often people underestimate their abilities. They set their

goals far too low. This might have a rather negative effect, in that too low levels of challenge might lead to boredom. Goals should be of moderate difficulty to remain as a motivating source.

In summary, effective goal-setting can help you to succeed in increasing your involvement in physical activity. When planning your specific goals ...

- **consider previous physical activity history**
- **define realistic and achieveable goals**
- **state criteria for progress evaluation**
- **define intermediate goals when the ultimate goal cannot be reached immediately.**

**Some last notes!**

You know far more about your exercise restrictions than you probably think you do. You know your body. You know how your body will respond to physical stress, you know when and where it hurts. Use all of this knowledge at any time when making a decision about exercise. Of course, you may also ask your physician for advice. If your physician expresses any concerns, ask for a detailed explanation of the precautions that you should take. No physician will say that you are not capable of doing some activity.

When starting to increase your physical activity level, you might experience some discomfort either at the time you are active or the day after. This is quite normal. It is a natural reaction of your body to an uncommon situation. For example, sweating may create a feeling of discomfort to a novice exerciser, but it certainly is not dangerous. Use common sense judging how much discomfort you are able to tolerate.

Acute illness of any kind will demand special precaution. Any acute situation will have weakened your body's capability to withstand any major physical stress. You should not exercise that part of your body that is affected, but other areas might be exercised. For example, you may consider upper body exercise to be appropriate if you have sprained your ankle. Similarly, you may still carry on with gentle stretching exercise if you have a cold.

Handout #2

# PHYSICAL ACTIVITY INVOLVEMENT

Decision-making process

Your intention to increase your physical activity involvement will require you to make a number of decisions. You will have to decide on what kind of an activity you would like to do, when you like to do it, where you would like to do it, and with whom you would like to do it. Making a decision is a balancing of options of which only one be chosen at any one time. This can be a problem because often more than one alternative appears inviting. For example, you may have to decide between going for a walk with a friend or watching a favourite television-show. Deciding on a specific behavior is to select what seems best and most desirable at the moment.

Making a decision is influenced by many factors. Past experiences, expected outcomes, other people's behavior, and environmental constraints (such as the having or not having of money) can all have an effect on the decision you make. Moreover, the decision that you make will not only affect you but also others important to you.

Your commitment to increase your physical activity involvement involved a major "decision" on your part. Evidence indicates that thinking through a decision systematically (e.g., to swim, stretch, ect.) increases the probability of succeeding in carrying out the decision. Thinking through the potential benefits and potential costs of the program can increasy your commitment. Completing a decision-balance sheet has been found to be an efffective way to systematically consider the costs and benefits of your decision to increase your activity level.

Would you be willing to complete a decision-balance sheet now with respect to your decision to be more physically active?

If you can spare a little bit of time, consider eight aspects I have outlined on this page. Take a pencil and go through the list item by item (You may want to use the attached worksheet). Write down your thoughts for each item. Do not rush through this procedure - you do it completely for yourself.

1. Write down the gains you assume you will get from being regularly involved in a physical activity.
   Examples: cardiovascular benefits, strength increase, enjoyment
2. Write down possible losses or costs to yourself.
   Examples: less time at hand, discomfort (sweating) while doing it
3. Write down possible gains from your activity involvement for people who are important to you.
   Examples: joining them in an activity, improved outlook at life because of reduce tension
4. Write down possible losses from your activity involvement for people who are important to you.
   Examples: reduced time together, financial stress, difficulty in meeting other people's demands
5. Write down signs of approval for your activity involvement that others might give you.
   Examples: admiration of your doing, respect of your achievements
6. Write down signs of disapproval for your activity involvement that others might give you.
   Examples: disapproval could mean criticism of your behavior, not adhering to social norms
7. Write down how you might self-approve your doing.
   Examples: fulfillment of dreams, feeling better, feeling more confident

8. Write down how you might self-disapprove your intended doing.
   Examples: feeling too old to be seen in sweat-pants and gym-shoes, feeling embarrassed, feeling to make a fool outof yourself

After you have put down your thoughts on these eight issues, you should once more review your responses. Remember the chances of adhering to a regular physically active lifestyle are increased when you are aware of all possible consequences. Be certain to use all the information to check on your decision on whether or not you want to increase your activity level.

| GAINS TO SELF | * | LOSSES TO SELF |
|---|---|---|
| | * | |
| | * | |
| | * | |
| | * | |
| | * | |
| | * | |

**********

| GAINS TO IMPORTANT OTHERS | * | LOSSES TO IMPORTANT OTHERS |
|---|---|---|
| | * | |
| | * | |
| | * | |
| | * | |
| | * | |
| | * | |

**********

| APPROVAL FROM IMPORTANT OTHERS | * | DISAPPROVAL FROM IMPORTANT OTHERS |
|---|---|---|
| | * | |
| | * | |
| | * | |
| | * | |
| | * | |
| | * | |

**********

| SELF-APPROVAL | * | SELF-DISAPPROVAL |
|---|---|---|
| | * | |
| | * | |
| | * | |
| | * | |
| | * | |

Handout #3

# PHYSICAL ACTIVITY INVOLVEMENT

You can improve your motivation to adhere to a more physcially active life in various ways. The last two pamphlets focused on increasing your awareness about your own activity-related goals and your decision making. This time, the **writing of a contract** and **social support** are introduced as means of putting your intention to increase your regular physical activity involvement into action.

As you know a contract is a written agreement, usually between two parties. In this case, though, the contract will be an agreement with yourself. The steps in writing such a contract requires you to:

1. define your goal, (which you did in the first pamphlet)
2. increase your awareness of the possible consequences in your attempt to reach this goal, (which you did last time)
3. state your desired action in a contract. (which you will do this time)

As an example, suppose the specific goal that has been defined is to do stretching exercises on five days a week, for ten minutes each time. In accordance with the suggestions of the previous *Physical Activity Involvement* pamphlet, the gains and losses for ourselves as well as others who might experience a result of this activity action should be considered. If it is concluded that it is a desirable thing to do, then a contract could be written.

The contract involves making a specific statement of the action and its consequences. You need to distinguish between the consequences that follow when the goal is reached and those that follow when it is not reached. Example: *Contract statement* - I will stretch for ten minutes, five days of the week. *Possible consequence* - If I stretch five days or more, I may treat myself by going out for supper. - If I do not stretch five days for ten minutes each, I may not watch a favourite tv show until I have reached my goal.

The fun thing is there are no limits to your imagination when setting up your own contract and its possible consequences. What is important is to set your consequences in such a way that it is possible for you to achieve them. Yet it takes you some effort to do so. The consequences you define should serve as a motivation for you and not punishment. After all, you have voluntarily chosen to increase your activity involvement.

Social support

Social support is another important factor that affects regular physical activity involvement. Your social support system is made up of people you know, you interact with, and you share common interests with. Support occurs when you are provided acceptance and respect by others. Example: your spouse, family member or friend might invite you to go for a walk. In doing so, this person will provide you with an opportunity to achieve one of your goals. Another example: you might set aside a specific time for visiting your friend to do the stretching exercises together. In this case, the two of you will provide social support to each other. Through your own initiative you can choose the individuals you would like to be a part of your social support system. You can also recruit or educate individuals to provide social support for you.

Surveys show that the chance of being physically active is increased markedly if your spouse, family, and friends also exercise. Thus, to create your own supportive environment, consider the following:

- discussing your goals and intentions with somebody who is important to you
- explaining the benefits you hope to see from being involved
- asking for assistance in reaching your goals
- discussing possible threats to your plan

- planning an activity (e.g. aquasize, cycling, etc.) at which they can join you

Personal preference may determine which items of the above you may want to consider. For example, if you are a person who enjoys socializing and doing things with others, you might want to consider setting up an activity with friends. On the other side, if you prefer doing things by yourself but like to share your achievements, talk to your spouse about your reasons for exercising alone and discuss your progress.

You need others for playing card games, you do not need them for exercising. However, they may join you if both have a shared interest in participating together. Planning your activities with somebody else can enrich your activity program tremendously.

Handout #4

# PHYSICAL ACTIVITY INVOLVEMENT

Self-monitoring

Of all the people who make an effort to increase their physical activity involvement, 50% remain active for an extended period of time. The other 50% return to their previous, more sedentary lifestyles. The primary reason for this is lack of motivation. To counteract this, various strategies can be used. One of the most effective stratgies is called "self-monitoring".

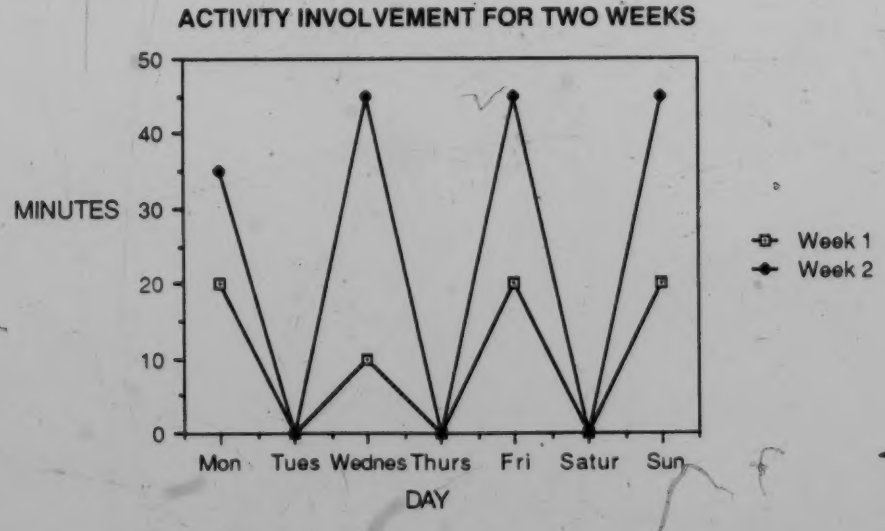
Self-monitoring involves keeping a written record of a self-chosen activity. Written records tend to improve adherence by making people accountable to themselves. They provide feedback on accomplishments and progress which can motivate continuation of the activity. They also assist planning ahead, and increase awareness of barriers which might prevent regular involvement.

Self-monitoring simply involves recording your physical activity involvement - (a) the number of times activities are deliberately engaged in for the maintenance and improvement of physical fitness and (b) the duration of each involvement. The monitoring can be done weekly but a daily recording is preferable.

In order to monitor your activity involvement all that is needed is some sort of a diary and perseverance in recording what you do. A calendar makes an excellent diary because they are inexpensive; and they can be posted in visible places where they can serve as reminders. The right calendar can also allow the recording of both what you did and what you want to do; thus, functioning as a diary and a planner for your future activity involvement.

A graph of your activity involvement is another form of a diary that can help you self-monitor your activities. Rather than writing down the time you spent doing activities, you can graph it for each day of the week. Your progress over weeks and months can be seen if you use different colors or different symbols for subsequent weeks.

Here is an example of such a graph for two weeks. Suppose someone walked on Monday, Wednesday, Friday, and Sunday for two consecutive weeks, increasing the amount of time spent walking from twenty minutes to thirty-five minutes on Monday, from ten minutes to forty-five minutes on Wednesday, and so on. The graph would look like this:



By the way, the diaries you are presently keeping are examples of this self-monitoring strategy and its effectiveness. By increasing awareness of the physical activity behavior, many have become physically active on a regular basis. And this was the goal, wasn't it?

To what do you owe your success?

In explaining success or lack of success we commonly attribute the outcome to one of four reasons. These reasons are called internal or external and stable or unstable. Internal aspects originate within oneself (e.g. motivation). External aspects originate from factors outside of oneself (e.g. environment). Stable and unstable conditions reflect the variability of both internal and external factors. For example:

Attributing success to an "**internal-stable**" condition indicates that success was due to one's own ability and talent; it was controlled by oneself.

Attributing success to an "**internal-unstable**" condition means again that success was due to oneself, however, it was affected by one's mood and effort.

Attributing success to an "**external-stable**" condition indicates that success depended on factors which are consistent but not within one's own control; it was a matter of the difficulty of the task.

Attributing success to an "**external-unstable**" condition means that success was uncontrollable; it was due to luck.

Adherence to a decision to increase one's physical activity involvement can be made easier if the reasons for succeeding in the attainment of the goal are considered. Try to answer the question: "Why have I been successful in attaining my goal?" By reflecting on the four conditions mentioned above and placing your answer into one of the squares provided. Example: Success might be measured by swimming two lengths uninterrupted. Being able to do so might be due to your ability, due to the size of the pool, due to your mood, or due to your luck.

| | INTERNAL | EXTERNAL |
|---|---|---|
| STABLE | ability | task demands (excessive either in terms of skill or time) |
| UNSTABLE | effort (motivation) | luck (something came up) |

Attributing success to an "internal-stable condition", is most beneficial for the ultimate attainment of goals because it means YOU assume complete responsibility for the achievement of this goal.

Attributing the unsuccessful attainment of goals to an "external and/or unstable condition is also beneficial. The recognition of such factors allows the potential for altering the surrounding conditions so as to increase the chance of future success. Using the previous example: You might say being unable to swim two lengths uninterrupted was due the number of other swimmers around, the height of the waves, or the difficulty of the

goal. All these conditions can be altered: You can go swimming when you expect fewer people in the pool, or you can set your goal to two lengths with a brief break at the turn.

Handout #5

# PHYSICAL ACTIVITY INVOLVEMENT

Self-reinforcement

Self-reinforcement is one way you can help yourself stick to your objective of being physically active on a regular basis. You tend to reinforce yourself if:

1. You feel genuinely good about yourself for having accomplished something, and/or
2. You reward yourself for having accomplished something.

Both or either one can be instrumental in helping you adhere to something you have voluntarily chosen to pursue (e.g. walking regularly); but are not always all that easy to put into practice.

To help you make self-reinforcement work for you; here are a few hints:

1. Select activities you are interested in and you like doing. The chance of adhering to an activity you choose voluntarily (such as walking) is increased if it is an activity you **want** to do rather than think you **should** do. **Having fun** is one of the most important factors that helps people stick with an activity (and this is not only true for your involvement in physical activities).
2. **Give yourself credit for what you accomplish**. Recognize your accomplishments as results of your own actions and free of the influence from luck, the environment, or others.
3. **Think of all the positive things** that are resulting or can result from your regular involvement in physical activities. For example, think of how much better you usually feel after having walked or curled; how much easier you climb the stairs now after having walked regularly; how much better your flexibility is after having done stretching exercises. While focusing on the positive aspects associated with your regular activity involvement, try to avoid thinking of the negative aspects. For example, thoughts such as "I will never improve in ..." or "I am too old to do ..." should be put to rest quickly.
4. Set goals that are both attainable and visible. This allows you to easily evaluate your own progress. **Recognizing improvements** will most likely reinforce your doing. For example: Say you set a goal to walk two miles in 30 minutes. If you managed to do it in 35 minutes, which is less than the hour you needed to do it **before** you started walking regularly, you should be proud of your accomplishment.
5. **Treat yourself for your own accomplishments**. Example: You may decide on buying yourself a nice exercise outfit after you have reached your goal, to walk two miles in 30 minutes.

**Your ability to reinforce your own behavior may be the key to experience the long-term benefits of regular physical activity involvement.** Good luck in putting any or all of these suggestions into practice.

Handout #6

# PHYSICAL ACTIVITY INVOLVEMENT

Relapse prevention or *"How to keep from going back to your old habits".*

Your goal to be physically active on a regular basis involves both increasing and maintaining your physical activity involvement. Previously we pointed out ways for you to do both of these. This time, the focus is on how to cope with the times you feel like "skipping out" and not doing the physical activity you had planned. Everyone experiences a desire to skip a planned physical activity at one time or another. For example, there is a "high risk" for this happening when the physical activity you had planned on doing and another activity compete for the same time.

The chance of missing your "self-selected" physical activity can be reduced if ...

- the activity has become a habit and is always done at the same time.
- the activity has been scheduled so that it does not run at the same time as other activities you enjoy doing.
- the activity is approved by a person who is important to you.
- the activity is done with a person who is important to you.
- the activity is one that gives you pleasure and makes you feel good about yourself.
- the activity is one that you are capable of doing.
- the activity is one that brings you feelings of success and accomplishment.

Although you are encouraged to try and avoid "high risk" situations which could cause you to miss a workout, you should also be aware and comfortable with the fact that missing your activity (walking, stretching, swimming, etc.) once or twice is not a disaster. It will not result in a significant loss of your present level of fitness or the loss of your "new found habit". It is the repeated skipping of workouts over extended periods of time that is more likely to have such a detrimental effect. To prevent a relapse to your "old ways" try to be aware of high risk situations. Simply being aware of them is the best start to being able to deal with them appropriately.

Create an environment that helps you adhere to your goals by avoiding "high risk" situations. For example,

- plan your activities ahead of time.
- post reminders to yourself regarding your physical activities.
- commit yourself to your activity by informing others of your intentions and goals.
- focus on a variety of activity to avoid boredom.
- think regularly (monthly or every other month) about the effects (benefits) of your involvement in physical activities.

Do you consider physical fitness of value to your overall well-being? YES - NO
If you answer this question with yes, you should try to avoid "high risk" situations which might prevent you from being physically active.